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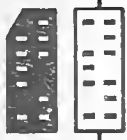
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# *Illinet Output*

University of Illinois at Urbana-Champaign-----Department of Computer Science

Vol. 1, No.1

January 1969

## **DEAN ANNOUNCES NEW COMPUTER RATE**

Daniel Alpert, Dean of the Graduate College, recently approved a new rate for the use of the IBM 360 service facility. The new effective rate for the IBM 360/75 will be \$225 per hour as compared to the old rate of \$300 per hour. This new rate will be retroactive to August 1, 1968. There have been no billings since that date while the rate structure has been under study with a view to setting levels which more accurately reflect the use.

through an NSF grant. It is hoped that by the time the grant is exhausted, use of the service will have grown to the point that it will be self-supporting at levels comparable or below the present levels. ■

## **COMPUTER COMMITTEE FORMED**

A Committee of users which will advise the Head of the Department of Computer Science on matters relating to computer service held its first meeting January 6, 1969.

this standing committee consists of professors N. M. J. Fenves, H. H. Hilton, H. Smith, and

This volume is bound without vol. 1 no. 8

which is/are unavailable.

on of this Committee will be the main channel for their needs and will supplement this in that area. The committee will see important service operations and the number of the likelihood of a final decision. ■

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# *Illinet Output*

University of Illinois at Urbana-Champaign-----Department of Computer Science

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The rates for peripheral equipment, which are designed to recover full costs, remain the same. Current experience indicates that the cost of peripherals is averaging about \$75 per CPU (u.c.) hour. This leads to an overall rate of approximately \$300 per hour, and this figure has been used by the Research Board in its allocations of research computer time. The peripheral rates will be reviewed when there is more experience.

The rate for the IBM 360/75 is reduced from actual cost

through an NSF grant. It is hoped that by the time the grant is exhausted, use of the service will have grown to the point that it will be self-supporting at levels comparable or below the present levels. ■

---

## **COMPUTER COMMITTEE FORMED**

A Committee of users which will advise the Head of the Department of Computer Science on matters relating to computer service held its first meeting on January 6, 1969. The members of this standing committee are Professors N. M. Bedford, S. J. Fenves, T. J. Harratty, H. H. Hilton, M. S. McVay, J. H. Smith, and W. F. Stoeker.

The formation of this Computer Advisory Committee will open an additional channel for users to make their needs known and will supplement this newsletter in that area. The next year will see important decisions on the service operation and the larger the number of inputs the more the likelihood of an optimal decision. ■

Editor . . . . . D. Smith

Printed ten times yearly by  
the Department of Computer  
Science of the University of  
Illinois, Urbana, Illinois  
61801

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## EDITORIAL POLICY

This newsletter is designed to serve both computer users and those with administrative responsibility for financing computer use in research and education. It is not meant to be a medium for transmitting technical information, a function which will continue to be served by the technical memoranda issued from time to time by the Department of Computer Science. An attempt will be made to make the newsletter one which will be of general interest and of a nontechnical nature.

Contributions by readers outside this department will be welcomed as long as they observe the following constraints. Articles should be directed to the Editor, Illinet Output, Department of Computer Science. Those submitted will not be returned, but a notice of acceptance will be sent to authors of articles to be published. All articles must be signed, but the byline will be suppressed on request.

In addition, space will be devoted to selected, short communications containing questions or suggestions of general interest. When appropriate, replies will be pre-

pared by qualified members of the department and will be published along with the selected letters. It is important that the statements be as concise as possible or that a short summary be provided for the publishable version. The Department of Computer Science will, of course, continue to welcome such communications even when not written for publication.

It is hoped that this newsletter will open another useful channel of communication between the department and those concerned with the use of the computer facilities on this campus. ■

---

## SOUPAC DEVELOPED

SOUPAC is the name of the package of programs developed for the IBM 360 by the SOUPAC group of the Department of Computer Science at the University of Illinois at Urbana-Champaign. The acronym SOUPAC is comprised of the words: Statistically Oriented Users Programming and Consulting group.

The SOUPAC collections are now operational for many common statistical and data manipulative procedures. Among the operational programs are the ones for matrix operations including eigenvalues and vectors; for several kinds of correlation coefficients including multiple correlations; and for discriminant analysis.

(Continued on Page 4)



## SYSTEM STARTUPS

Generally speaking, the major concerns of computer service management are connected with throughput, cost, and turnaround. In a center with a saturated computer, the main effort is directed toward an improvement in the amount of computation performed, the throughput of the system. The cost will be more or less fixed and minimal in a static hardware configuration that is fully utilized. The queue at the central processor usually controls the turnaround.

The delivery of a new system has an unsettling effect on computer service because it usually means that one moves from a completely saturated system to a highly unsaturated condition. This brings about a sudden change in emphasis when considering the above three factors.

In a heavily saturated system, turnaround is usually controlled by the queue at the central processor. The desire for improved turnaround is associated with the hope for an increased number of runs and more machine usage, but this hope must remain largely unfulfilled on such a saturated system. Thus, the queue and its associated turnaround is the self regulating device for matching the demands on the system to its capacity.

As soon as the new system arrives, the situation changes.

Initial use is low and cost per computation skyrockets. The throughput, so important in the saturated phase, is now largely irrelevant. This follows from the observation that it costs very little more to operate a heavily used system than a lightly used one. The user's dollar pays for a certain percentage of the total usage of the unsaturated system rather than for a fixed amount of time. If the machine runs inefficiently on the problem mix, it will simply run for a longer time. Although the throughput will affect the other parameters when treated as an intrinsic characteristic of the system, its importance is reduced.

Under these conditions, however, the turnaround on the newly installed system is of crucial importance. In the first place, most users will be debugging problems and most problem submissions will not require much time. The overall problem progress and total time consumed will depend critically on the turnaround. In fact, experience shows that the time used on the computer is roughly proportional to the number of jobs run, at least during this phase; so improved turnaround leads to more utilization and lower cost per computation.

An examination of our system will show that very little of the turnaround is consumed in the queue of problems waiting to be processed in the CPU. Therefore, improvement in computational throughput

should not enjoy a high priority at this stage. The present bind is at the printer and breakdown stations. An obvious way to alleviate this condition is to install more printers and breakdown stations, but although this is currently impossible because of financial restrictions, there are indications that income is increasing and that this action will soon be possible. Notice that there is a dilemma, improved turnaround increases income but increased income is needed to improve turnaround. An alternative solution is for a user or group of users to install a remote job entry station which has its own read and print station so that the central system will introduce only a computational delay. Along with the convenience of remote job entry, there are often economic advantages since the use of peripherals in the present system are now charged separately. This topic will be the subject of a later article, but from preliminary studies it appears that the best turnaround will be obtained through the use of these terminals.

In summary, the main effort at this stage of service use should be directed at reducing turnaround time. A number of ideas are being pursued but suggestions would be welcome for achieving such an improvement. ■

J. R. Pasta  
Head, Department of  
Computer Science

(SOUPAC from Page 2)

A manual of instructions for SOUPAC is in the planning stage. Presently, users and prospective users are urged to go to 138 DCL to receive instructions for these programs. ■

K. W. Dickman  
Assoc. Prof. of  
Computer Science  
and Sociology

## OPTICAL CARD SCANNER BOUGHT

Everybody talks about the long queues in the keypunch room, and now something is going to be done about it. An optical card scanner, capable of reading either standard punched cards, or cards marked with an ordinary No. 2 pencil, or both (they can even be intermixed within a deck), has been ordered by the Department of Computer Science.

Delivery has been promised for January, and with good luck in the programming and debugging phases, the new reader should be operational during the spring semester.

Sense marking is done by hand on specially prepared cards similar to the one shown. Fortran coding is simplified by the use of a number of standard keywords, such as CONTINUE, DIMENSION, GO TO, etc., that require only a single mark. The Fortran card provides for a statement number, a keyword, and then a series of columns, 16 on the

This is the first issue of the newsletter, "Illinet Output", by the Department of Computer Science. If you would like to continue reading about the changes, the plans, and the development of the Department and its Computer Service Center, detach and complete the form below. Your correct address is needed for a more speedy mailing. Return this form to: Editor, Illinet Output, 114 DCL, Department of Computer Science, University of Illinois, Urbana, Illinois.

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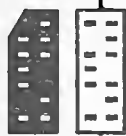
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# Illinet Output

University of Illinois at Urbana-Champaign-----Department of Computer Science

Vol. 1, No.2

February 1969

## Department Offers Programming Course

The Department of Computer Science will offer a short course on Computer Programming for faculty members starting in March. The course will cover programming for the University's IBM 360 computer, with emphasis on FORTRAN IV (as described in the Paperbound text A GUIDE TO FORTRAN IV Programming, by D. D. McCracken which can be purchased at the Illini Union Bookstore).

The class will be led by the professional staff of the Systems Consulting Group. There will be sixteen one-hour sessions given in either of the following sequences: A. 2-3:00 p.m. on Tuesday and Thursday or B. 11-12:00 noon on Tuesday and Thursday. (Those graduate assistants who may wish to take a similar course can do so by enrolling in CS 400.) Those interested should write to Merlin J. Foster, 175 Digital Computer Laboratory, giving the following information: 1. Name, 2. Position and Department, 3. Campus address and phone

number, and 4. Order of preference for class times.

This information should be received by Monday, March 3, 1969, so that section assignments can be made and returned to the individual persons attending the course. If the sections are filled, applications will not be accepted after March 3. It is intended that the first class will be held the week of March 17, 1969.

## New System Proposed

Recently completed studies of the University of Illinois System/360 computer complex have revealed several important statistics concerning the overall efficiency of the system. In particular, it has been verified that 1) utilization of the Model 75 Central Processing Unit (CPU) is relatively low, and 2) the Model 50 support computer, which is responsible for all peripheral processing, is now running in a saturated condition.

(Cont'd. on Page 2, Column 2)

Editor . . . . . D. Smith

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## DO NOT FOLD...

The development and applications of computers in this decade were the subjects of a recently produced series of radio programs which featured staff members at the University of Illinois and other campuses. The series, entitled DO NOT FOLD . . . , was prepared by WILL Radio, and broadcast during the fall and winter months. Some of the topics included in the series were computer application in governmental research, agriculture, medicine, education, libraries, police departments, the fine arts, and in weather prediction. Experts across the United States participated via tape recorded comments. The series' sixteen programs, each 30 minutes in length, are now being distributed by the National Association of

Educational Broadcasters and  
the Voice of America for  
national use.

Jiffy Johnson  
Producer of  
DO NOT FOLD...

---

NEW SYSTEM. . . (Cont'd. from  
Page 1)

Model 75 CPU utilization could be improved by the introduction of multiprogramming (execution of several jobs concurrently), but this alone would further worsen the imbalance between the two computers. The problem is one of improving Model 75 performance while drastically relieving the peripheral processing overload on the Model 50 computer.

A possibility now under consideration by the Department of Computer Science consists of the rearrangement and/or replacement of various hardware components within the system which would result in the single-processor configuration illustrated in figure 1. With the multiprogramming option of the Operating System/360 control program, the peripheral functions now controlled by the Model 50 computer would become the responsibility of a high-priority job executing on the Model 75. The remaining Model 75 core storage would be used for the concurrent processing of application programs. It is important to note here that the proper balance between  
(Cont'd. on Page 3, Column 2)



## DCS Tests Timesharing

A test version of PL/ORTS Phase 0 (filing system and remote job entry) is now operating on the IBM 360/50. The system is a timesharing system which shares 360/50 time (or rather that part of it left over from controlling the batch system) among a possible 64 remote terminals. Although it is not yet ready to be made available to the general public, it is currently being used by guinea pig users on a "use at your risk" basis.

PL/ORTS, PL/One Remote Terminal Subset, is a system expected to be operational around the end of this year which will compile and execute PL/1 programs in a timesharing mode. The current system allows the user to build and modify files which may be Job Control Language programs, or data and to submit these files for processing in the batch system. Output from the batch system may also be put into a user's file by using appropriate ASP control cards.

The system may be accessed from any of several teletypes in the Digital Computer Laboratory which are permanently connected. Users outside DCL may access the system through teletypes connected to the telephone system by dialing 3-4000. Details on the use of the system and what it is and is not able to do may be obtained from the consultants.

N. Weidenhofer  
Prof. of  
Computer Science

NEW SYSTEM ... (Cont'd. from Page 2)

peripheral processing and execution of user jobs would now become a matter of software adjustment instead of hardware modification.

In summary, the proposal is based on the fact that the Model 75 CPU is powerful enough to support all peripheral functions and several user jobs simultaneously if adequate core memory, direct - access storage, and peripheral input/output equipment is provided. The cost of this necessary equipment would be largely absorbed by the removal of the Model 50 computer.

Future issues of this newsletter will contain articles describing the effect of multiprogramming (under the proposed configuration) on the preparation and execution of user jobs.

R. Wells  
Senior Research  
Programmer  
Dept. of Computer Science

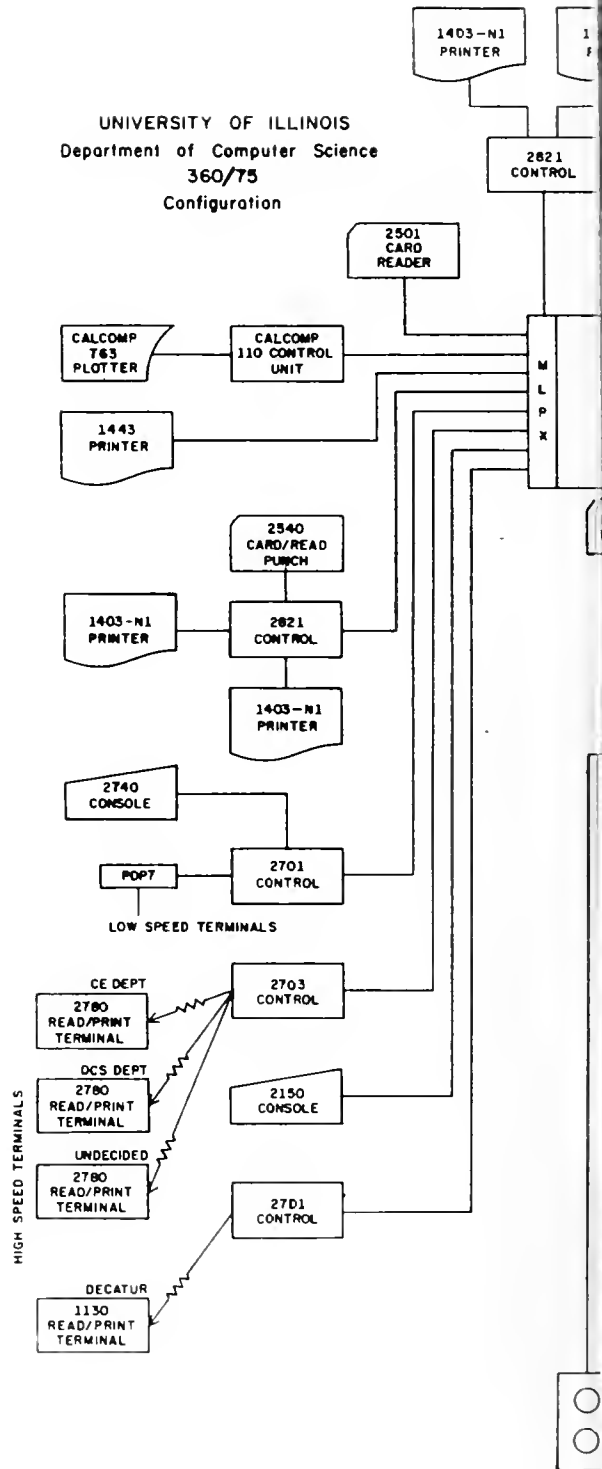
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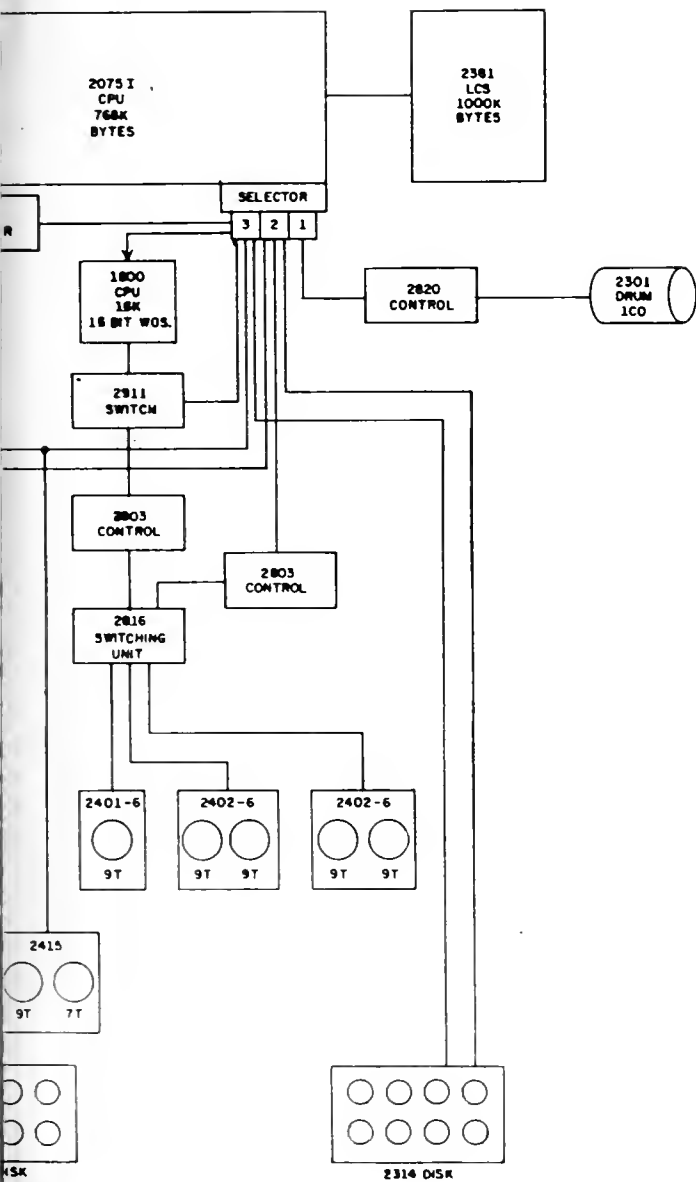
### Figure 1: 360/75 Configuration

The following two pages contain the configuration of the new system proposed for the Computer Service Center of the Department of Computer Science.

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Department of Computer Science  
360/75  
Configuration





## Three Remote Terminals To Be Connected

For many years the only way someone could run a program on a computer was to take the program deck, by hand, to the nearest computer installation. Now it is possible to submit programs at some place separate from the main installation, and to have the input and output transmitted back and forth over telephone lines. Submitting jobs in this fashion is commonly called Remote Job Entry (RJE). In addition to the advantage of a closer input/output station, RJE also offers better turn-around time than can be obtained using the main installation's readers and printers.

The Department of Computer Science has plans to connect three additional remote terminals by approximately June of this year. (The Adolf Meyer Zone Center in Decatur has had one for about 6 months now). The new terminals will be IBM 2780's with a card reading speed of about 180 cards/minute and a printing speed of 130 lines/minute. With forthcoming technical advances in the communications field, these figures should increase by the end of the year to 360 cards/minute and 200 lines/minute.

Each department that has a 2780 will pay for its rental and operating costs. If a user has a long print job, he

can still submit it at his terminal and request, through control cards, that it be printed on DCS's high speed printers. However, if a user reads and prints a job on his own terminal, he does not have to pay DCS's charge for reading and printing (\$2.10/thousand cards and \$.33/thousand lines). A department or group of departments which has about 500 thousand cards read and has about 1 million lines a month printed may find that for about the same amount of money that they are now spending at the main installation, they can have a remote terminal and all its advantages.

Thomas Allen  
Data Processing Analyst I  
Dept. of Computer Science

---

Figure 2: IBM 2780 Data  
Transmission Terminal  
Model 2

The IBM 2780 Data Transmission Terminal, Model 2, used as a remote job entry terminal consists of a printer, card reader, and card punch. It utilizes a new line control technique-binary synchronous communication-and operates over 2400 bps telephone lines. Print width can be either 80-, 120-, or 144-characters and can accommodate 52 or 63 possible characters. The 2780 can also be used for off-line listing at 300 lines per minute.

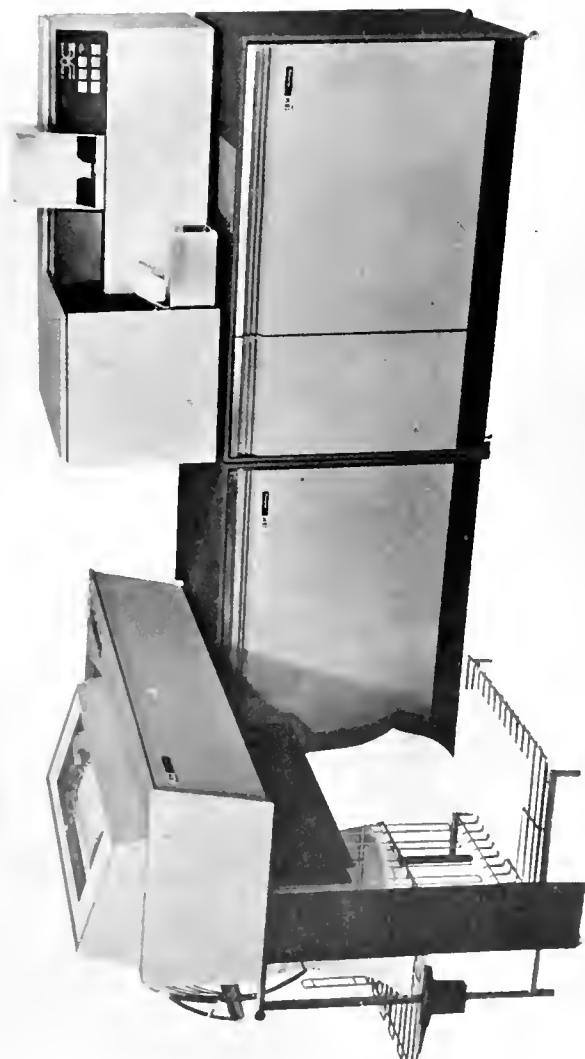
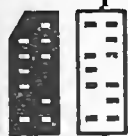


Figure 2: IBM 2780 Data Transmission Terminal, Model 2

Department of Computer Science  
University of Illinois at Urbana-Champaign  
Urbana, Illinois 61801



# Illinet Output

University of Illinois at Urbana-Champaign-----Department of Computer Science

VOL. 1, NO.3

March 1969

## 7094 Meets Its Demise

The IBM 7090 was delivered and installed in August, 1962, replacing the IBM 650 and ILLIAC I. Its arrival introduced the second generation of computers onto the University of Illinois campus.

The initial software package was an adaptation of the University of Michigan's 7090 system. As the months passed, the 7090 was modified up to a 7094, and the software package was modified, added to, and as a result, evolved into the highly efficient, unique PORTHOS system. All members of the Department who had a part in the development of PORTHOS, justifiably felt proud of the results of their efforts. Its peak production was 31,700 jobs during the month of October, 1967.

As the 7094 replaced the 650 and ILLIAC I, so now is the 7094 being replaced by the IBM 360/50-75. As of July 1, 1969, computing service on the 7094 will no longer be available to users of the facilities of the Department of

Computer Science. To facilitate the conversion of 7094 users' programs to the 360, the consulting area offers a programming service for the users for a fee.

---

## Record Set In February

In February, research use of the IBM 360 central facility hit a new peak of 176 hours, in spite of the shortness of the month. This use covered almost 10,000 separate jobs. During this same period, there were about 18,000 student runs for a total of 121 hours.

Because of system bottlenecks mentioned in the last ILLINET OUTPUT, there have been periods, recently, when the input stream had to be stopped until the backlog was cleared. This situation is becoming worse as usage increases, and every effort is being made to phase in the new system as quickly as possible.

Editor . . . . . D. Smith

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## Optical Card Reader News

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Will the new scanner, that the Department is getting, read IBM Mark Sense Cards and what will be its accuracy? The MRC 1501 optical card reader will not handle the cards read by the IBM Mark Sense Reader. The cards used on the MRC 1501 are of the same type but with a different format. The reader will read ordinary punched cards as well, and they may be intermixed with the handmarked cards.

The Department does not have experience as to the accuracy of the scanner but it is expected, from the reports of other users, to be quite good. Generally, the cards must be marked correctly and free from smudges. In the case of erasures, the reader will store the correct mark and the erasure and will then choose the darker of the two. All columns in the message field

will have a mark including a mark for a blank column so that a comparison is always possible. If two marks are within the acceptance limits, an error message is generated by the software.

A more serious question is the reliability of the hardware and the corresponding down time. The reader has already been returned to the factory once for modification of the reading heads because they needed cleaning too often. It is hoped that the reader will be operational in early August.

---

## Queries

Six months ago, the Department of Computer Science urged its users to submit written complaints, suggestions, and questions involving the Service Area. Not all complaints could be immediately corrected. Not all suggestions could be implemented. However, enough positive good came from this means of communication that an attempt will be made to include, as a regular feature of ILLINET OUTPUT typical complaints, suggestions, and questions that have been received and the resultant action, if any, taken. Due to limitations of space, they will be shortened when necessary.

(Continued on Page 3)



QUERIES: (Continued from Page 2)

COMMENT: There should be a complete set of manuals available to users at all times. I forgot how to get a binary deck from FORTRAN. I looked for information in the Key punch Room on a Sunday and I couldn't find it.

REPLY: Steps have been taken to see that one person is in charge of updating all three manual racks (machine room, consultant office, and key-punch area).

SUGGESTION: On the output board, the machine was stated as in scheduled engineering at 11:15 on Tuesday, November 26. Why did the board say scheduled engineering when the engineers released the machine at 9:00 am? It was obvious that the machine was being used for some other purpose. This purpose should have been stated. Scheduled engineering implies a hardware change, check, or failure, and it tends to decrease user confidence in hardware inversely to the length of the time the sign is up.

REPLY: Scheduled engineering does not necessarily imply a hardware change or failure. It does imply a period of time wherein maintenance engineering is performed. Through past experience, maintenance or scheduled engineering has been found to be a more efficient means of maintaining computer equipment at a peak condition

than unscheduled engineering whenever there is a hardware failure. Scheduled engineering has been set up on a permanent basis for the 360 configuration. On Tuesdays, this period is until noon. When this time is not needed by the engineers, the machine is and has been returned to the operating staff for normal production work. On the day mentioned, Tuesday, November 26, it was returned to the operating staff at 9:30 am. Due to a time card problem within the system, a systems programmer had the machine at that time until 10:45 am, at which time normal production was resumed. I think you can understand why it would prove rather difficult to post a minute by minute log of who has the machine and for what reason.

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Department of Computer Science  
University of Illinois at Urbana-Champaign  
Urbana, Illinois 61801

Dean R. B. Downs  
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# *Illinet Output*

University of Illinois at Urbana-Champaign-----Department of Computer Science

VOL.1, NO.4

April 1969

## Debugging Reduces Cost

It is very tempting to allow the computer to debug your program for you. A run is made, indicated errors are changed, and the deck is re-submitted. In some cases, three or four such runs must be made before the actual logic of the program becomes the focus of code checking. The first few runs, many times, can be eliminated, thus reducing the cost of machine runs and the job load in the 360, by observing some or all of the following steps.

1. As much as is possible, give extensive desk time to reviewing and checking the logic of the program.

2. Utilize the consultants to check your JCL statements to eliminate possible JCL errors.

3. Take the time to generate a listing of your program on the 360/20. This procedure could help detect keypunch errors as well as other source program errors that might not be obvious from the handwritten copy or interpreted cards.

## Query Implemented

**SUGGESTION:** Several times in recent months my punched 360 output has been lost. One possible reason is that my decks were mixed up with someone else's decks. At present, only the last card in the punched output is labelled with the job number. If the first card were also punched with the job number, it would be easier to tell where one deck ended and the next deck began by comparing first and last cards in the deck. (Dec. 22, 1968)

**REPLY:** We find your suggestion a valuable one. Therefore, a systems programmer from the Service Area has been assigned to implement OS so that the first card of punched output on the 360 will be punched with the job number. We hope this implementation will be accomplished reasonably soon. (This was implemented within a month and a half.)

---

Charles Babbage carried on a lifelong battle with street musicians.

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## Report Increase In 360 Usage In March

The Department of Computer Science reports a large increase in the usage of its 360 facilities in March 1969. The usage statistics for the IBM 360 for the months of March 1969, and March 1968, are contained in the following table for comparison.

|                      | March 1969   |               | March 1968   |               |
|----------------------|--------------|---------------|--------------|---------------|
|                      | Runs         | Hours         | Runs         | Hours         |
| Training & Education | 25830        | 188:37        | 16502        | 151:36        |
| Research             | 10053        | 159:11        | 4277         | 113:31        |
| Total                | <u>35883</u> | <u>347:48</u> | <u>20779</u> | <u>263:07</u> |

In the comparison of March 1969, to March 1968, the following percentage increases are shown:

|                      | Runs       | Hours      |
|----------------------|------------|------------|
| Training & Education | 57%        | 24%        |
| Research             | 135%       | 42%        |
| Total Usage          | <u>73%</u> | <u>32%</u> |

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# *Illinet Output*

University of Illinois at Urbana-Champaign-----Department of Computer Science

VOL.1, NO.5

May 1969

## 360 Subsystems Described

The IBM OS/360 package contains, in addition to the usual complement of compilers and assemblers, a series of library subprograms and sub-routine packages that can prove of use to the user who may need to perform mathematical or statistical analysis and does not wish to develop his own subroutines to do this. Write-ups explaining how to use the packages described below can be found in the Consulting Office, Room 167 of the Digital Computer Lab.

### Mathematical Subroutine Library

The 360 Mathematical Subroutine Library, written by the Department of Computer Science, is a group of routines concerned primarily with numerical algorithms. The 360 Mathematical Subroutines have been incorporated into the system so that if a program calls for one of these routines, it will automatically come from the system library. Some but not all of the routines available in the library perform the following mathematical functions.

Polynomial Reducer  
Root Finder for Polynomials  
with Real Coefficients  
Bessel Functions  
Fourier Integrals  
Legendre-Gauss Quadrature  
Laguerre-Gauss Quadrature  
Gauss-Jacobi Quadrature  
Mechanical Quadrature  
Polynomial Interpolator  
Linear Equation Solvers  
Matrix Inversion  
Eigenvalues and Eigenvectors

A current index of the routines in this library is posted on the Department of Computer Science's Service Area Bulletin Board.

### Mathematical Programming System

The IBM Mathematical Programming System (MPS/360) is a linear programming system similar to LP/90 but with significantly greater capabilities. The use of MPS/360 might involve building a mathematical model, finding an optimal solution, determining the ranges of the objective function elements and right-hand-side elements for which the solution is optimal, com-

(Continued on Pg. 2, Col. 1)

Editor . . . . . D. Smith

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### 360 SUBSYSTEMS: (Continued)

puting a sequence of related optimal solutions as selected constraints are progressively changed or costs progressively varied, and preparing a management report.

#### General Purpose Simulation System

The IBM General Purpose Simulation System (GPSS/360) is a computer program for conducting evaluations and experiments of systems, methods, processes, and designs. In addition to providing all the features and capabilities available in GPSS III, GPSS/360 introduces new entities, block types, and expanded features to increase the versatility and ease of use of GPSS.

#### Continuous System Modeling Program

The IBM Continuous System Modeling Program (CSMP/360) is a program for the simulation of continuous systems. It provides an application-oriented input language that accepts problems expressed in the form of either an analog block diagram or a system of

ordinary differential equations. Data input and output are facilitated by means of applications-oriented control statements.

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## Resumes Filed at DCS

The Department of Computer Science has on file a number of job application forms completed by students wishing part-time or full-time work in a computer-connected field. This file of applications is available to any member of the University who may wish to employ such a person. Requests to see the application file can be made from 8:00 am to 5:00 pm on Monday through Friday at the Information Desk in the lobby of the Digital Computer Lab.

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## UILOADER Documentation Available

SUGGESTION: I have been unable to obtain a writeup of the UILOADER. I am aware of the parameters DUMP, DECK and MISS, but wonder if there are more of which I am unaware. (Jan. 2, 1969)

REPLY: Please accept my apologies for the unavailability of a complete writeup of UILOADER before now. This writeup is now available to users in the Consultant Office, Room 167 DCL. (Jan. 6, 1969)

## MVT Accounting Studied

With the introduction of MVT in September 1969, (See April ILLINET OUTPUT), a new method of accounting must be initiated. What follows is an abstracted version of a memorandum generated by Mr. Richard Wells in reference to possible accounting algorithms that might be used for charging purposes under MVT. This is presented to the reader of ILLINET OUTPUT as an example of one of the many factors to be considered when new systems are introduced into a computer installation.

The following are definitions of unique phrases used in this discussion:

system resource - a hardware component of the computing system which may (directly or indirectly) be used by a job. For example, the CPU, internal storage, data channels, peripheral input/output devices may be thought of as system resources.

OS/360 - Operating System 360 - a supervisory program used on System/360 computers.

MVT - Multiprogramming with a Variable Number of Tasks (See ILLINET OUTPUT - April, 1969).

compute bound - refers to a job which performs relatively little input/output, spending the majority of its time utilizing the CPU.

input/output bound - refers to a job which utilizes one or more input/output devices extensively, requiring relatively little CPU time.

system environment - refers to the status of the computer when a given job is run - in particular, the nature of the other jobs in the system and the status of the resources for which jobs are competing.

WAIT state - refers to the condition of a job which cannot utilize the CPU until the completion of an external event (such as an input/output operation).

region size - the amount of internal storage required for execution of a job.

CPU time - the amount of time in which a job was actively using the CPU.

WAIT time - the amount of time which a job spent in a self-imposed WAIT state.

TASK time - the sum of CPU time and WAIT time.

WAIT count - the number of times a job placed itself into the WAIT state.

What follows are five suggested accounting algorithms that could be used under MVT to provide the Department of Computer Science with the necessary information to satisfy university and governmental accounting requirements. More

## Queries Answered

COMPLAINT: On December 19, 1968, no Category I jobs were run after 8 a.m. because of the running of CS101 jobs or something. "What is the department's policy on this?" (Dec. 19, 1968)

REPLY: The Service Area policy for running CS101 jobs is to try to guarantee one run a day for CS101 students. However, the large volume of extra jobs plus a CS101 problem being due on Friday, December 28, 1968, caused a sudden increase in our job load. Another factor contributing to this situation was the use of the PL/I language for the last CS101 problem. PL/I runs much slower than WATFOR.

SUGGESTION: Require users of system disk space to code RLSE subparameter in their SPACE parameter. This has the effect of returning all unused space to the system when the data set is closed. (Dec. 3, 1968)

REPLY: Users are counselled to use the RLSE feature when it is appropriate for them to do so. Since the nature of our operation is so diverse in user needs and requirements, we attempt to keep those situations in which we require the users to do something to a minimum. It is not felt that the gain from such a requirement as you suggest would outweigh the extra burden to the user and the resultant dissatisfaction that would arise

from taking such a course. In addition, to enforce such a requirement would require adding a JCL scan which would result in an overhead increase.

SUGGESTION: 1. Acquisition or reinstatement of a card sorter for cheaper costs on strictly card sorting tasks. 2. Change the rate of keypunch service to hourly costs - this because the major cost is not cards but rental of machines and salaries of personnel. (Nov. 31, 1968)

REPLY: 1. A card sorter is on order. This will allow our users to do their own sorting. (NOTE: Sorter is installed and operational.) 2. The rate for keypunch service does not reflect card cost. The \$2.35 cost for 100 cards was arrived at by using the rental cost of equipment and a portion of the salaries of the keypunch girls and the number of cards keypunched by an average keypunch operator.

QUESTION: Is it possible to move the main reader to a position where users with large decks can obtain a service similar to that now enjoyed by smaller deck users? The combined reader facility would eliminate the need to match input and output during breakdown - access could be via hall door to machine room. (Dec. 5, 1968)

REPLY: One problem would still exist if your suggestion were implemented. There would still



be times that, due to multi-box jobs being submitted, a backlog of jobs to be read in would occur. It is understood, though, that this would not be the case all the time and that an advantage to some of our large-job users would result.

Recommendations have been made and are being studied for redefining the hardware configuration in the 360/50-75 complex. Serious consideration is being given to placing your suggestion and others we have received involving a rearrangement of the operations area into action if this configuration change occurs.

Until such time as we are in a position to make a major revision in the physical layout of the machine and routing rooms, we are taking the necessary steps to see that during the daily Noon to 8:00 pm period a person will, at all times, be manning the reader, printer, breakdown table, and console for setups. A revision in the way output is internally handled in the routing room is now being undertaken. This revision is the first step in a series of steps that may ultimately lead to implementation of your suggestion.

## April's 360 Usage Reported

The Usage statistics for the IBM 360 for the month of April 1969 are contained in the following table:

|                      | April 1969 |       | April 1968 |       |
|----------------------|------------|-------|------------|-------|
|                      | Runs       | Hours | Runs       | Hours |
| Training & Education | 23181      | 168   | 20832      | 225   |
| Research             | 8602       | 126   | 8897       | 210   |
| Total                | 31783      | 294   | 29729      | 435   |

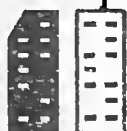
April 1969 shows the following percentage increases or decreases over April 1968.

|                      | Runs | Hours |
|----------------------|------|-------|
| Training & Education | +11% | -25%  |
| Research             | -03% | -40%  |
| Total Usage          | +07% | -32%  |

Department of Computer Science  
University of Illinois  
Urbana, Illinois 61801

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# *Illinet Output*

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VOL.1, NO.6

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June 1969

JUL 29 1969

## Department Offers Keypunching Service

UNIVERSITY OF ILLINOIS

A keypunching service which processes jobs at the rate of \$2.35/hundred cards punched and \$2.35/hundred cards verified is offered by the Department of Computer Science. (When an individual submits a job to be keypunched and verified, he would be charged \$4.70/hundred cards.) Jobs may be submitted to the keypunch staff in Room 129, from 8 a.m. Monday to 8:15 a.m. Saturday.

Key punch jobs are classified in two categories: keypunch short (KPS, 20 pages or less) and keypunch long (KPL, over 20 pages). Verifying cards is a process of checking for keypunching errors only. The IBM 360/20, located in Room 129, is capable of doing the following.

1. REPRODUCE: punch a new deck or cards like the original deck

2. INTERPRET: print the characters represented by the card punches across the top of each card

3. CONVERT: change BCD (026) card code to EBCDIC (029) card code

4. LIST: print a deck of cards on paper, one card per line

5. LIST/DOUBLE SPACE: print a deck of cards on paper, one card per line, with a blank line between each printed line

6. SEQUENCE: reproduce and interpret a deck, punching numbers in the last columns of each new card. These numbers may be incremented by one's or by ten's

7. SORT: place cards in order by specified columns

8. GANGPUNCH: punch the same information in specified columns on each card of a deck

9. COLLATE: compare, match, or merge more than one deck or select specified types of cards from one deck

10. MULTILITH: print a deck of cards on multilith, one card per line. The multilith is then taken by the individual to a print shop for mul-

(Continued on Page 2)

Editor . . . . . D. Smith

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(DEPARTMENT OFFERS ....

From Page 1)

multiple copies to be run. This  
is usually used by persons  
writing their thesis.

Jobs are processed on  
the IBM 360/20 at the rate of  
\$14.00 per hour. Decks con-  
taining 200 cards or less  
which are submitted between  
the hours of 8 a.m. - 12 noon  
and 1 p.m. - 9 p.m. will be  
processed on a while-you-wait  
basis. If the user is not  
willing to wait at Room 129,  
the job will be processed at  
a later time. Decks containing  
over 200 cards will be run  
between the hours of 12 noon -  
1 p.m. and 9 p.m. - 8 a.m.

Keypunches, verifiers,  
and an 082 card sorter are  
available to individuals for  
use twenty-four hours a day,  
seven days a week. These  
machines are located in Rooms  
131 and 166 of the Digital  
Computer Lab. It would be  
helpful if each individual  
using the machines would re-  
turn unpunched cards to the  
bins and throw away any which  
are of no value. The Depart-  
ment provides a user work  
area in Room 166; therefore  
individuals should not use  
the machines for this purpose.  
Persons will be asked to give

up the machines when they are  
observed using them as a work  
area.

In answer to a couple of  
questions frequently asked by  
users, the card color makes  
no difference to the computer,  
and the computer will read  
cards with preprinting in the  
center of the card. Any ques-  
tions will be answered by the  
keypunch staff in Room 129.

## System Status Report

Hardware changes:

On May 26, an additional  
2314 arrived, allowing one  
2314 to be dedicated to the  
50 and one to the 75. This  
has improved overall system  
performance since there is no  
longer contention between the  
two CPU's for 2314 access.

One 2401 and one 2402  
tape drives were returned and  
a 2415 tape drive was acquired  
on May 26.

On May 28, an additional  
256k of high-speed core was  
added to the 50, producing  
improved performance of ASP  
and time-sharing.

On June 1, the four 2311  
disk drives were removed from  
the system.

Two new 1403 printers  
have arrived and will be put  
in service soon.

Three 2780's have been  
installed - one in the Civil  
Engineering Department and  
one in the Chemistry Depart-  
ment. The third is being  
used by a summer institute

in Humanities and it will be taken over by the State Water Survey in the fall.

#### Software changes:

On June 2, the operating version of ASP was upgraded to version 2.2. This version contains support for bi-synch terminals (such as the 2780). Also, the format of the /\*ID card has been changed and now allows additional options. A writeup concerning this is available from the consulting office, Room 167 DCL.

At the same time a new accounting process has been adopted. The last sheet (or "burst page") of each 360 run contains a breakdown of each service used during the job and gives the total dollar charge for the job. Off-line records are kept of all services used; on-line tables, due to limitations of space, contain only the dollar amount authorized by the department head for that problem specification number. Each burst page will contain the dollars remaining as shown in the table for the problem specification number used.

These tables are updated once a day by the total amount chargeable to each problem specification number for runs made in the previous 24 hours. A problem specification number will be inactivated if all the authorized money is used up. A facility is also provided to inactivate all problem specification numbers using a given University account

number if that account runs out of money. Initially, all research board account numbers will be handled in this way.

---

## PLORTS Available To Users

Programming Language One Remote Terminal Subset consists of a number of components which enable the user to make use of the ILLINET computer system remotely by the use of a low cost typewriter-like device. The components include the terminal and coupled communication lines; a communications multiplexor computer (PDP-7); a filing, editing, and remote job entry facility (currently an IBM 360/50); and a batch processing system (an IBM 360/75). The first of these components is in the users' building, while the remaining three are in the Digital Computer Laboratory. The user will have to make his own arrangements to obtain the use of a terminal, either by having one installed (members of the Department of Computer Science may be consulted about this), or by arranging to use one already installed in his building. The facilities in the Department of Computer Science area are available via the communication lines to all authorized users.

In addition to obtaining a terminal, the user must have a valid problem specification number (PS#) for the 360 system, and have made arrange-

(Continued on Page 4)

(PLORTS: From Page 3)  
ments with the service group to use the PLORTS system. Once arrangements have been made the users' identification will be recorded in the system to be used in signing on.

At present, PLORTS contains the facilities for inputting and changing files which may be used as programs or data, for running files, and for obtaining their output. There are three different groups of commands available in PLORTS -- those in the file editing system for constructing and changing files; those in the batch processing system which modify execution; and those in the communications multiplexor which assist in the formatting of input information and help to make the teletype function like a keypunch.

## **Format Changes**

ILLINET OUTPUT will not be published during July and August. Publication of ILLINET OUTPUT will resume with the September 1969, issue. With that issue, the reader will receive a newly-formatted ILLINET OUTPUT. Of full page size, it will contain four sections.

### **1. NOTICE BOARD**

This section will contain the pertinent, 48-hour notices which, until now, appeared in the Department of Computer Science Information Bulletin. Published periodically in the past,

the DCS Information Bulletin will no longer appear after September 1969.

### **2. INQUIRY STATION**

A section devoted to questions, suggestion, and complaints directed to the Service Area by our users. Input to this station may be received directly from the user for publication or it may be excerpted from inquiries directed to the Service Area.

### **3. RESEARCH and DEVELOPMENT**

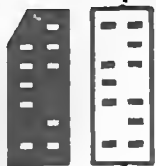
By now, Service Area users are only too aware of the constant hardware and software changes, corrections and developments that occur in the OS360. It has become a way of life and will no doubt be with us indefinitely. This section will be devoted to future plans for the re-configuration, if any, of hardware and coming developments in software.

### **4. MISCELLANEOUS**

Any item of interest that does not naturally fall within the first three sections will appear here.

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# Illinet Output

University of Illinois at Urbana-Champaign-----Department of Computer Science

Vol. 1, No.7

September 1969

## NOTICE BOARD

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### ADSUP User's Guide

An Analog-to-Digital Conversion Supervisor (ADSUP) has been coded for users of the IBM 1800. This supervisor supports the conversion to digital values of any type of voltage waveform data from an experimental apparatus. Digital values output from the Analog-to-Digital Converter (ADC) of the 1800 are written onto the 360's nine-track tapes via an 1800 special feature which attaches an 1800 data channel, through a switching unit, directly to a 360 tape control unit. Copies of the ADSUP User's Guide can be obtained in the Consulting Office, Room 169 DCL.

### PAPER TAPE READER

A high speed Elliot Paper Tape Reader for the IBM 1800 was operative as of September 1, 1969. Currently supported software includes a program which reads ASCII paper tape and generates EBCDIC card images for subsequent IBM System/360 processing.

### IBM 1800 Charge

As of September 1, 1969, users of the IBM 1800 are being charged \$50 per hour of 1800 CPU time. These charges will be reflected on the September bills and will be deducted daily from the dollar amount of computer usage originally requested on the Problem Specification Form.

### User Disk Dumps

During the past, the Service Area has made a practice of dumping

user packs UIUSR1, UIUSR2, UIUSR3, and UIUSR4 onto tape every weekday. The purpose of this was to have a backup of each disk to restore in case one or more of these disks should become defective. Since the installation of the additional 2314 in June 1969, the need to restore a user disk has not arisen. The dumping of these disks required from 15 to 20 minutes of 75 time each day. Since the dumps have not been needed, it is felt that dumping these disks once a week will still provide a reasonable backup if errors should occur on the disks, and, at the same time, release approximately an hour of 75 time each week for processing production work. Therefore, effective Monday, August 25, 1969, the user packs UIUSR1, UIUSR2, UIUSR3 and UIUSR4 have been dumped once a week. This dump will occur every Saturday morning during the midnight to 8:00 a.m. shift. Should a user detect what he believes to be a disk problem on any of his data sets, he should immediately see a consultant Room 169 DCL.

### Changes to System

The following changes became effective August 3, 1969:

1. Punch has been corrected so that garbage is not punched in the remaining columns when the format specified is less than 80 bytes. This had been occurring in WATFOR and PL/I.





EDITOR . . . . . Nick Smith

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2. All PL/I go steps in the catalogued procedures have been changed so DCB=BLKSIZE=80 is specified on the SYSPUNCH and SYSPNCH cards. PL/I users no longer need override the catalogued procedure or specify the BLSIZE in the program in order to punch.

### Faculty Short Courses

During the fall semester, the Service Area will offer an expanded Series of non-credit, no-fee short courses to aid the users and prospective users of the IBM System/360. The courses are open to all faculty, staff, and graduate students. Practical exercises and applications using the 360 computer will be emphasized during the 6-week period of this instruction. Each course will meet for 2 sessions per week: a 1-hour lecture period and a 2-hour discussion/workshop period, for a total of 3 hours per week. Those interested should complete the form contained on the last page of this newsletter and return it not later than September 26 to: Rosalyn Munds, 173 Digital Computer Lab., 333-0969.

Questions or comments concerning these courses may be directed to Robert Skinner, 193 Digital Computer Lab., 333-6145.

1. FORTRAN IV LANGUAGE. Prior programming experience is not required. Knowledge of High School Algebra is sufficient mathematical preparation. Course will include introduction to computing systems and programming, FORTRAN IV language and syntax applications, use of IBM System/360. Several programming problems will be presented. Two sections are planned for this course. (See schedule below.)

2. 360 ASSEMBLY LANGUAGE. Knowledge of a programming language is recommended, preferably FORTRAN. Course will include: introduction to IBM System/360, control language statements (JCL), syntax, use of assembly language statements, and applications and practical problems on IBM System/360.

3. ASP-JCL-UTILITIES. This course is designed for the current or prospective IBM 360 user who would like to utilize the IBM System/360 resources fully. Working knowledge of a programming language is essential. Course will include a systematic discussion of OS/360 Data Management and JCL (Job Control Language). The use of IBM System/360 Utility Programs and ASP (Attached Support Processor) statements will be presented in practical examples and course problems. Storage requirements and timing considerations will be discussed.

The schedule for these classes is given below. You will receive written confirmation of your course request the first week of October. At that time you will be notified what text, if any, will be used in the course.

Oct. 13 - Nov. 21

FORTRAN IV LANGUAGE                      Section A:  
Mon. 1-2 P.M.,                      Wed. 1-3 P.M.

FORTRAN IV LANGUAGE                      Section B:  
Tues. 11-12 A.M.,                      Thurs. 10-12 A.M.

ASSEMBLY LANGUAGE  
Mon. 10-12 A.M.,                      Wed. 10-11 A.M.

ASP-JCL-UTIL  
Tues. 1-3 P.M.,                      Thurs. 1-2 P.M.

### **INQUIRY STATION**

Complaint: I very strongly object to the fact that whenever a job is submitted on the 360, it is placed on a priority "list" according to the number of subprograms and subroutines that are



employed within the program. Then people with later jobs that have fewer subprograms and subroutines have their job run before the previously submitted jobs. I believe this is entirely UNFAIR!

Reply: I am sorry that you are under the impression that the number of subroutines within a job are used to determine the priority which that job receives for processing. If you refer to Notice No. 1167, you will see that the priority is determined by the 75 CPU time, that is, the time estimate given by you on your ID card.

Suggestion: CCPIMZ does not work, and the current ink used on the plotter will not reproduce. My suggestion is that India ink be used consistently on all jobs (on the Calcomp plotter). It is darker, clearer, and copies nicely.

Response: CCPIMZ does, indeed, not work. A Systems Programmer has been assigned the responsibility of maintaining the entire CalComp package. It is hoped CCPIMZ will soon be operative.

A problem arises when we constantly use the dark liquid ink for zip mode. At certain angles, when the pen is traveling in zip mode, it will vibrate due to the resonant frequencies of the equipment. This results in the drawing of non-continuous lines. Additionally, the type of pen needed for this dark ink can cause the plotting paper to be torn should a user trace the same line many times. Until such time that these mechanical problems are solved, use of the dark ink for all plots would prove impractical.

We are investigating the feasibility of software changes that will result in easier and more efficient communication between the 360/50-75 and the operator when the operator must perform such functions as changing the pen and/or paper on CalComp. We hope that this action plus the additional one of providing a Systems Programmer to be responsible for the CalComp software will soon alleviate the problems you speak of.

I realize this is not as satisfactory a response as is desired. However, be assured that suggestions like yours do call our attention to problems that tend to be overlooked.

Suggestion: Please raise the maximum number of cards for which one may wait when doing only listing on the IBM 360/20. This should be possible because listing is much faster than reproducing or interpreting.

Response: I am pleased to inform you that effective immediately, the upper limit on the number of cards that can be listed on the 360/20 while you wait will be raised to 500 cards.

Suggestion: The following suggestion is the result of personal experience in programming and discussions with others who have passed the "beginner stage" of programming:

It would be extremely valuable if one or more times a semester a series of seminars could be presented covering such subjects as JCL, tape usage, disk usage, even keypunch drum usage, and perhaps some other topics such as the more common Utility programs.

To be effective, such seminars would have to be limited to persons who have at least completed a basic computer programming course or have an "equivalent" programming knowledge. Obviously, such seminars to be effective, would have to be carefully prepared, perhaps with handouts, and presented in English and not "Computereze". Once a person had attended such a series of seminars, or those sessions pertinent to his work, then he might be able to read and interpret to a better degree some of the IBM manuals which are written principally in "Computereze".

An effective way to announce the existence of such seminars (if developed) would be the distribution of a notice to this effect at the DCL Routing Room input window and provision of a supply to the remote terminals.

Response: A copy of the article about Faculty Short Courses that appears in this issue of ILLINET OUTPUT was sent



to the user who proffered this suggestion.

**Complaint:** When a deck is duplicated and interpreted (on the IBM 360/20) I get no bill. All I can do is guess how many cards I had processed and "guestimate" how much money I spent. Could you give us a cost when a run like this is made on the Model 20?

**Response:** The charge rate for the use of the IBM 360/20 is \$14.00 per hour. It has been suggested to the operators of the 360/20 that they indicate to users of that computer the amount of time spent on the computer in processing their particular job. This, of course, will not give you an estimate of the cards that were processed, but will allow you to keep your bill for any time period. Should you find that your 360/20 jobs do not contain this time estimate, please contact Mrs. Jenkins, Room 168 DCL.

## RESEARCH AND DEVELOPMENT

### Change from PCP to MVT

In September, The Systems Programming staff installed OS/360 Release 17 MVT (Multi-programming with a Variable number of Tasks) on the 360/75 computer. In order to support this system, the 360/50 software was upgraded to Release 17 MVT and ASP Version 2.3.

These changes were made in an attempt to reduce the most recent "bottleneck" in the 360 complex, the constant backlog of jobs waiting to be executed on the 360/75. It is anticipated that this problem will be alleviated by the reconfiguration of the 360 system which is currently scheduled for December, 1969.

Conversion to a multi-programming system, especially when the hardware configuration is somewhat less than optimal, requires some advanced planning on the user's part. For this reason, an "MVT Primer" is now available in the Consulting Office. Users

are urged to obtain a copy and check for items which are pertinent to their jobs.

There are also several important modifications necessary for the creation of catalogued procedures for Release 17, OS/MVT/ASP. A memo detailing those changes is available in the Consulting Office for those users interested in creating private catalogued procedures.

## MISCELLANEOUS

### Job Done Inquiry

With the arrival of the IBM 360/50-75, the problem of notifying a user when his job is finished and ready to be picked up has increased in complexity. Different methods have been tried, but no completely satisfactory method has been found.

With the availability of the new Bell touch-tone telephone system late in 1969, it is hoped that a satisfactory solution can, at last, be found. At present the appropriate IBM interface is being investigated, and the necessary software is being designed. The final result will allow a user to enter a number plus his job number and receive, from the computer, a tone which indicates whether his job is completed or not. This service will only be available to those persons with touch-tone phones.

### FORTRAN OPTIMIZATION HINTS

The following is a list of hints on how to optimize your FORTRAN coding in order to achieve better accuracy in calculations and to increase the speed of execution of your programs in general.

1. Analyze the problem before programming. The information obtained can be used to simplify the problem and speed up the numerical procedure.



2. Use a minimum of mixed-mode arithmetic. The extra coding generated can in some cases take more time to execute than the arithmetic itself. Use  $X=0.0$  instead of  $X=0$ ,  $I=0$  instead of  $I=0.0$ . Choose variable types to avoid conversions whenever possible.
3. Avoid using SUBROUTINES and FUNCTIONS for small repeated tasks.
4. Arrange the problem logic to avoid branches whenever possible.
5. Make the most probable result of all logical IF statements a simple drop through instead of a branch.
6. Use implied DO loops in input-output in place of I/O within actual DO loops where possible.
7. Calculate all quantities which are constant through a program at the beginning, and calculate all quantities constant throughout a loop outside the loop.  
For example:  

```
DO 20 I=1,450
20 C(I+3,2*I+1)=(D*(I+2))**(2*K)+
      E-2*L-1
```

 should be written  

```
M=2*K
F=E-2*K-1
DO 20 J=3,452
20 C(J+1,2*J-3)=(D*J)**M+F
```
8. Use as few subscripts as possible on arrays (i.e., use  $A(720)$  instead of  $A(12,6,10)$ ).
9. Use unconditional GO TO's instead of computed GO TO's.
10. Where possible pass variables to SUBROUTINES through COMMON instead of using parameter lists; this saves much time because addresses do not have to be passed down to the subroutines for the variable in the calling sequence.
11. Do not test for equality using floating-point variables, because of

round-off error in low-order bit.  
Use .GE. or .LE.

12. Use SQRT instead of  $**0.5$ , since the SQRT routine is faster than the logarithm routine used to evaluate expressions of the form  $X**R$ .  $X**R$  is computed through  $e(R*\ln(x))$ .
13. For small powers, use  $A*A*A \dots$  or  $A**I$  with  $I=R$  instead of  $A**R$ , where  $R$  is a floating point integer; values raised to integer powers are computed by repetitive multiplication, whereas values raised to real powers are computed by using logarithm and exponential routines.  $A**R$  is about four times slower than  $A**I$ .
14. Use unformatted I/O for scratch units. FORMATS waste time and space.
15. Use logical IF's instead of arithmetic IF's.
16. Store any array element used more than once in a loop in a temporary scalar variable.
17. Use assigned GO TO's instead of computed GO TO's.
18. Use logical IF's instead of 2-way GO TO's.





Usage statistics for the IBM 360 for the month of May, 1969, are contained in the following table:

|                      | May, 1969    |               | May, 1968   |              |
|----------------------|--------------|---------------|-------------|--------------|
|                      | Runs         | Time          | Runs        | Time         |
| Training & Education | 10485        | 202:06        | 16012       | 269:36       |
| Research             | <u>12147</u> | <u>290:09</u> | <u>4639</u> | <u>96:49</u> |
| Total                | 31632        | 592:15        | 20651       | 366:25       |

May, 1969, shows the following percentage increases over May, 1968.

|                      | Runs        | Hours       |
|----------------------|-------------|-------------|
| Training & Education | 22%         | - 25%       |
| Research             | <u>162%</u> | <u>303%</u> |
| Total Usage          | 53%         | 63%         |

Usage statistics for the IBM 360 for the month of June, 1969, are contained in the following table:

|                      | June, 1969   |               | June, 1968  |              |
|----------------------|--------------|---------------|-------------|--------------|
|                      | Runs         | Time          | Runs        | Time         |
| Training & Education | 5920         | 72:15         | 3052        | 43:45        |
| Research             | <u>12640</u> | <u>205:52</u> | <u>4869</u> | <u>93:00</u> |
| Total                | 18560        | 278:07        | 7921        | 136:45       |

June, 1969, shows the following percentage increases over June, 1968.

|                      | Runs        | Hours       |
|----------------------|-------------|-------------|
| Training & Education | 94%         | 65%         |
| Research             | <u>160%</u> | <u>121%</u> |
| Total Usage          | 134%        | 103%        |

Usage statistics for the IBM 360 for the month of July, 1969, are contained in the following table:

|                      | July, 1969   |               | July, 1968  |               |
|----------------------|--------------|---------------|-------------|---------------|
|                      | Runs         | Time          | Runs        | Time          |
| Training & Education | 11145        | 88:31         | 7871        | 75:31         |
| Research             | <u>17278</u> | <u>240:44</u> | <u>7739</u> | <u>143:25</u> |
| Total                | 28423        | 329:15        | 15610       | 218:56        |



July, 1969, shows the following percentage increases over July, 1968.

|                      | Runs       | Hours      |
|----------------------|------------|------------|
| Training & Education | 42%        | 17%        |
| Research             | 123%       | 68%        |
| Total Usage          | <u>82%</u> | <u>50%</u> |

Usage statistics for the IBM 360 for the month of August, 1969, are contained in the following table:

|                      | August, 1969 |               | August, 1969 |               |
|----------------------|--------------|---------------|--------------|---------------|
|                      | Runs         | Time          | Runs         | Time          |
| Training & Education | 4696         | 55:27         | 4399         | 57:12         |
| Research             | <u>15063</u> | <u>242:31</u> | <u>7786</u>  | <u>162:33</u> |
| Total                | 19759        | 297:58        | 12185        | 219:45        |

August, 1969, shows the following percentage increases over August, 1968.

|                      | Runs       | Hours      |
|----------------------|------------|------------|
| Training & Education | 6%         | - 3%       |
| Research             | <u>93%</u> | <u>49%</u> |
| Total Usage          | 62%        | 35%        |



## APPLICATION FOR FACULTY-STAFF SHORT COURSES

TO: Rosalyn Munds  
173 Digital Computer Lab.

DATE \_\_\_\_\_  
NAME \_\_\_\_\_  
DEPT \_\_\_\_\_  
POSITION \_\_\_\_\_

The following courses are offered during the Fall Semester, 1969  
(October 13-November 21). Please check the section(s) you wish to attend:

FORTTRAN IV LANGUAGE SECTION A: \_\_\_\_\_  
Mon. 1-2 P.M., Wed. 1-3 P.M.

FORTTRAN IV LANGUAGE SECTION B: \_\_\_\_\_  
Tues. 11-12 A.M., Thurs. 10-12 A.M.

ASSEMBLY LANGUAGE \_\_\_\_\_  
Mon. 10-12 A.M., Wed. 10-11 A.M.

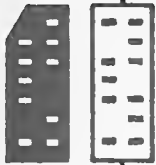
ASP-JCL-UTIL \_\_\_\_\_  
Tues. 1-3 P.M., Thurs. 1-2 P.M.

---

Signature



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# *Illinet Output*

University of Illinois at Urbana-Champaign-----Department of Computer Science

Vol. 1, No. 9

November 1969

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## Notice Board

### AMOS 3.0 Manual

The AMOS Version 3.0 User's Guide is now available in the Consulting Office. This manual obsoletes the AMOS 2.3 User's Guide and the ADSUP handout.

### Assembler G

A new version of Assembler G has been installed in the system. Differences between this version and the previous version are slight, and are principally extensions (all minor). Copies of the revised Assembler G User's Guide are available from the Consulting Office.

### Disk Attached to 1800 Computer

The 2310 Disk File attached to the IBM 1800 computer was discontinued on Monday, November 10, 1969, due to lack of use. After this action was proposed in a bulletin board notice, no significant interest was expressed in retaining the 2310 disk.

### FORTRAN SSP Library

During the first week in November, the release 17 version of the FORTRAN Scientific Subroutine package (FORTRAN SSP) was placed on

the system. This new version corrected known errors in many routines. In addition, two new routines, IQ and INUE, were added to allow evaluation of modified Bessel functions of various orders.

The IBM manual H20-0205-3 describes these routines. In addition, short descriptions of the subroutines and methods for their use are available from the Consulting Office. Any questions concerning SSP should also be directed to the Consulting Office

### PL/I Scientific Subroutine Package

The ARAMIS system now provides an interface which allows users of PL/I programs to call subprograms contained in the IBM PL/I Scientific Subroutine Package (SSP). Information on how to use these routines may be obtained by referring to IBM Manual H20-0586, and to the handout in the Consulting Office, 169 DCL.

### MAPDASD

The disk mapping utility MAPDASD has been removed from the system. This action has been taken because the utility has on occasion gone into infinite loops and has deleted permanent user datasets. MAPDASD has been replaced by ULLISTER (with an alias





EDITOR . . . . . Nick Smith

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---

name MAPDASD), which generates less  
detailed disk maps. No changes,  
therefore, need to be made to user  
programs which reference MAPDASD. A  
member of the staff is now recoding  
the MAPDASD routine.

## Inquiry Station

Note: Entries for the INQUIRY STATION  
originate with the "User Comment and  
Suggestion Form," which is available  
at the Information Desk and in the  
Consulting Office.

Suggestion: As implied by "F~~OR~~TRAN  
Optimization Hints" in the September  
issue of Illinet Output (Vol. 1, No.  
7), efficient programming and related  
matters can reduce costs and load on  
the system. A small manual, available  
through the consultants, along the  
lines of these "Hints" would seem to  
be worth putting out. Since the people  
most in need of such a guide are the  
occasional programmers, it should ex-  
plain fully and clearly all terms  
from "computereze."

Reply: As a direct consequence of  
your letter, several members of the  
consulting and programming groups are  
currently assisting in compiling an  
"Optimization" handout. This manual  
will include not only F~~OR~~TRAN hints,  
but also suggestions for optimal use  
of other components of the system.

Suggestion: For some unknown reason,  
it is next to impossible to get on  
timesharing until afternoon on  
Mondays. Either a job is being run  
which ties up the 50 or else the

programmers can't get timesharing to  
work properly. I'm sure they get  
tired of our calling the machine room  
everytime something goes wrong, so I  
would like to suggest the following:  
whenever timesharing is inactive, for  
whatever the reason, have the pro-  
grammer type out a message to the  
PL~~OR~~TS terminals telling us what is  
happening and how long we can expect  
to wait before PL~~OR~~TS is active again.  
This would save our time and free the  
programmers from having to answer  
several telephone calls everytime  
PL~~OR~~TS goes down.

Reply: The schedule for guaranteed  
timesharing is from approximately 9:30  
a.m. to 2:00 p.m. on Monday, Wednesday,  
Thursday, and Friday, and from 1:00  
p.m. to 2:00 p.m. on Tuesday. Recently,  
a change in ASP resulted in a reduction  
in the 360/50 core available to other  
parts of the system. Because of this  
reduction in available core, time-  
sharing was being removed from the  
system in the morning in order to run  
the necessary internal housekeeping  
routine. The Operations Group have  
subsequently agreed to make such runs  
before or after the guaranteed times  
quoted above and not during them.

A member of the Consulting Group will  
be notified by the operators when  
timesharing is inactive during the  
prime time hours. At that time he  
will enter the reasons why time-  
sharing is down and an approximate  
time for its reactivation.

Suggestion: Presently, the only way  
of finding out the charges on a run is  
to have printed output and refer to  
the burst page. Would it not be  
possible to put this information on a  
dataset so that a PL~~OR~~TS user could  
file this dataset and thus get the  
charges on a run, at least up to the  
time of filing, without having to use  
the printer?

Reply: A member of the programming  
staff is currently investigating the  
implementation of your suggestion.



Suggestion: What is the proper way, if there is one, to stop a transmission from the PDP-7 to a terminal? For example, when one commands LIST, the only way to stop the listing is to punch some character such as "space" or "break", but occasionally this causes an "ABEND" and one has to LOGIN all over again.

Reply: If the "BREAK" key is depressed briefly you can interrupt the "LIST" command. If it does not interrupt immediately, then a second depression of the "BREAK" key will usually produce the desired result. However, if the "BREAK" key is depressed for five seconds or longer, then the condition you mention occurs; namely, you have to LOGIN again.

Suggestion: It would speed up key-punching if one or possibly two machines were categorized "express". These machines could be on a raised platform so a person could use them while standing, and the limit could be 5-10 cards. This way a person with a few errors won't have to wait 10 minutes or more.

Reply: We are currently investigating the feasibility of placing two key-punches on a raised platform.

Suggestion: It would be helpful in determining how large to make the REGION specification if the summary page showed the amount of core actually needed for a given job. Then one could easily determine whether to make the REGION smaller if the same program is run again.

Reply: With the present configuration, ASP on the 360/50 can only account for what OS/MVT on the 360/75 tells it. OS presently does not provide the necessary accounting for the actual REGION size used. To implement this would require major programming modifications in OS/MVT, a step we are not currently in a position to take. Even to implement this suggestion at the time of the January, 1970 re-configuration, which will result in a stand-alone 360/75, would require

major modifications to ASP.

In an attempt to alleviate this problem, however, our staff is currently coding a subroutine which will be callable from FORTRAN. When called, this routine will return to the user the amount of core available at the point where the routine was called. The consulting group is also writing a handout which will explain in detail the most accurate methods of estimating REGION size. Notices will be posted when the handout and subroutine become available.

## Research And Development

### Separator Cards

Additional separator cards are now being punched between decks of punched output in addition to the regular separator cards. Up to four of these cards may be returned at the front or back of your punched output. They should be discarded like the normal separator cards. This action was taken in direct response to a user request appearing in the October issue of Illinet Output (Vol. 1, No. 8) that some measures be taken to prevent parts of punched output decks from being lost.

### Changes to CARDS= Parameter

Until Sunday, November 2, 1969 users' jobs had not been terminated for exceeding their card estimates. Many users had been using cards=0 to prevent scheduling of punch service, so that they could prevent punching of unwanted card output generated by their programs. These programs are now cancelled at the point in which the first card image output is generated.

One method of achieving the desired effect is to estimate the correct number of cards output on the ID card and include in the deck the following ASP control card:



/\*F~~OR~~FORMAT PU,DDNAME=ddname,C~~O~~PIES=0  
where ddname is:

SYSPUNCH - for object decks and PL/I  
          or Assembler punched output  
FTO7FOO1 - for FORTRAN punched output  
SYSPNCH - for PL/I punched output

### SNOBOL Operational

Version 2 of SNOBOL 4 is now operational under OS/MVT. SNOBOL may be invoked by:

```
/*ID <options>
// EXEC SNOBOL
//SYSIN DD *
<SNOBOL source deck>
<data cards, if any>
/*
```

Note the omission of a //J~~O~~BLIB card. Be sure to specify "REGION=230K,TYPE=CPU" on your /\*ID card.

The users' manual on SN~~O~~B~~O~~L 4 has been published in a soft-cover edition by Prentice-Hall. The Department is not in a position to stock copies of this manual. However, the bookstores have been notified concerning it.

### User Disk Space

Since the installation of the 360/75, the policy of the Department of Computer Science's Service Area has been to request users to apply for permanent disk space on their Problem Specification Form.

As of November 3, 1969, a program is run daily for the purpose of comparing actual disk space allocated on disks UIUSR1-4 with the amount of disk space approved. This program checks all class and research problem specification numbers. If a problem specification number is using space that has not been applied for or more than the approved amount, a letter is sent to the prime user requesting that the situation be corrected within one week. This may be done either by applying for additional disk space, or by reducing the amount of space being

used. If after one week there has been no response, the offending data sets are removed from the system and a letter is sent to the prime user listing the data sets removed.

This control of individual user disk space has become necessary due to the limited space available and the increase in number of users requesting disk space.

### PL/I - FORTRAN Printer Trains

We currently have four printers available, two capable of printing the PL/I character set (61 characters) and two capable of printing the FORTRAN character set (48 characters). The FORTRAN character set is a subset of the PL/I character set. In order to specify which character set a job is to be printed with, the following rules should be observed:

- 1) If the FORTRAN character set is desired, no special statements need be included in the job deck.
- 2) If the PL/I character set is desired, a /\*F~~OR~~FORMAT card for a print data set must be included. If the job already contains a printer F~~OR~~FORMAT card, one should add to that card the parameter TRAIN=PL1. If the job has no existing format cards, the card /\*F~~OR~~FORMAT PR,DDNAME=SYSMSG, TRAIN=PL1 should be included.
- 3) If special (user-provided) print train is to be used, a /\*F~~OR~~FORMAT card with the appropriate TRAIN= parameter must be supplied.

If more than one conflicting TRAIN= parameters are supplied on different /\*F~~OR~~FORMAT cards, all but the first one will be ignored.

The following characters appear on the F~~OR~~TRAN printer train.

A-Z . (period)  
0-9 ' (apostrophe)



+ \$  
 -  
 \* ,  
 / =  
 ( blank  
 )

In addition to the above characters, these additional characters appear on the PL/I printer train:

< \_ (underline)  
 >  
 & | (vertical bar)  
 ;  
 % :  
 — ("not" sign)  
 # @  
 "

## Miscellaneous

### Optimum Job Submission Times

Recent observations of the System/360 work load have shown that peak job loading times occur on weekdays between late morning and early evening. This means that the job backlog is worst during the weekday p.m. hours. Therefore, to improve turnaround time, users might consider submitting their jobs during the slack loading periods, which are, generally speaking, midnight to 10:00 a.m. on weekdays, any time on weekends. Note that these times are not valid when the system is down for scheduled engineering, software development, problems, holidays, etc.

### Problem Specification Number 1000

Problem specification number 1000 is a number that can be used free of charge for "short, one-shot" runs. The purpose of this number is to allow members of the university community to experiment on a short term basis with the various compilers, etc., contained within the IBM 360 System Limits on CPU time, cards read, and lines printed were set for the use of this P.S. Number. Until recently, however, these limits have not been

enforced internally within the system. Because of this lack of enforcement, abuses of P.S. number 1000 have become a serious problem. Therefore, as of Monday, November 3, P.S. number 1000 jobs have been restricted in the manner described below. These restrictions are enforced internally within the system.

Upon recognition of the P.S. 1000, the ID card is scanned, and a monetary value is computed from the estimated values (CPU time, cards read, cards punched, lines printed, 1800, etc.) given on that card. If that computed value exceeds \$1.00, the job in question is not run. A message giving the reason for rejection is returned as output.

In addition to this monetary check, all P.S. number 1000 jobs automatically go into HOLD with a priority of zero. Once a day, during the early morning hours, these jobs are released by the operator and processed.

The following figures will help you estimate the cost of your job.

1 sec. of CPU time = (115K Region)  
 approx. 4.1 cents  
 100 lines of printing =  
 approx. 3.3 cents  
 100 cards read in =  
 approx. 21.0 cents  
 100 cards punched =  
 approx. 31.5 cents  
 1 min. 1800 time =  
 approx. 83.3 cents

### Keypunch Service

The Service Area maintains a keypunch service for its users in Room 129 DCL from 7:30 a.m. Monday until 8:00 a.m. Saturday.

Keypunch jobs are classified in two categories: keypunch short (20 pages or less) and keypunch long (over 20 pages). All keypunch jobs are





processed at the rate of \$2.35 per hundred cards punched. Verifying cards, a process of checking for key-punching errors, is billed at the same rate. The charge for having a hundred cards both keypunched and verified would, therefore, be \$4.70.

Users with a large volume of work to be punched are encouraged to submit their jobs in sections. This helps user turn-around and may possibly allow the user to begin computations before his entire job is punched.

Also located in the keypunch area is an IBM 360/20 which, at a rate of \$14.00 per hour, is capable of doing the following:

- 1) reproducing decks;
- 2) interpret decks;
- 3) convert BCD (026) card code to EBCDIC (029) card code;
- 4) list decks;
- 5) sequence decks;
- 6) sort decks;
- 7) gangpunch;
- 8) collate.

The above features are described in more detail in the June, 1969, Illinet Output.

## QUIZ

The answer to each of these definitions is a word or phrase associated with computing.

1. Part of the spine
2. Percussion instrument
3. 12 1/2 cents
4. Woman's loose-fitting garment
5. Sightseeing bus
6. Primary challenge for a swimmer
7. To comfort

8. Double star
9. Another percussion instrument
10. "What time does the next Greyhound leave?"
11. An evening in Oberammergau
12. Moisture cycle
13. System programming staff
14. Farmer's supplementary income
15. Group headed by Maxwell Smart

## ANSWERS

1. disk
2. drum
3. bit
4. shift
5. Turing machine
6. channel
7. console
8. Algol
9. symbol (cymbal)
10. bus-out check
11. Abend
12. do loop
13. character set
14. parity check
15. control unit





## MAILING LIST

For additions or deletions to the ILLINET OUTPUT Mailing List, please return complete page to Editor, ILLINET OUTPUT, 127 DCL.

Please (include, delete) my name for the ILLINET OUTPUT Mailing List.

Name-title: \_\_\_\_\_

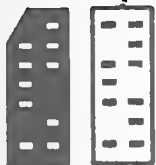
New Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

For change of address please indicate old address, unless it is printed below:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



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# Illinet Output

University of Illinois at Urbana-Champaign-----Department of Computer Science

Vol. 1, No. 10

December 1969

## Notice Board

### Holiday Greetings

To our users

We gladly welcome the opportunity the Season presents to extend our warmest Holiday Greetings to you, and to express our appreciation for the patronage you have accorded us. We hope to enjoy the privilege of serving you in the future. In the meantime, may you have the brightest holiday ever, and may the New Year bring you all manner of good things.

The Service Area of the Department of Computer Science.

### 360= Parameter

The 360= parameter on the /\*ID card, which represents the total CPU time that the job can use, is now being checked. Execution of any job which exceeds this time estimate will be terminated.

### CalComp Library for PL/I

Library routines for use of the CalComp plotter by PL/I programs are now available. The Consulting Office has information available on how to obtain writeups of these routines, and how to set up PL/I programs to use them.

### Library Subroutines with WATFØR

Many users have been obtaining subroutine decks from either the UØI Mathematical Subroutine Library or the

IBM Scientific Subroutine Package and using them with WATFØR programs. Users should note that these subroutines have not been checked out with the WATFØR compiler and may use features that WATFØR does not allow. Users should be aware that modifications may be necessary and refunds will not be given by the Consulting Office for routines that do not work properly with WATFØR.

### UIUPDAT

UIUPDAT is a program designed to manipulate source libraries. It can be used to alter existing modules in the library, create new ones, assemble, link edit, and update object libraries. Further information on the use of UIUPDAT is available in the Consulting Office.

### Scratch Disk Space

Users desiring additional disk space for temporary data sets may make use of the 2314 disk pack UISCR1. This pack has 3999 free tracks on it and may be accessed simply by including the following card in your deck.

/\*SETUP UNIT=2314,ID=UISCR1

The Department does not assume the responsibility for fixed amounts of free space being available on this pack at any given time; however, since it is intended that any data set on this pack is temporary (i.e., available only during the scope of one's job), a user may scratch any or all



EDITOR . . . . . Nick Smith

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data sets on this pack in order to  
execute his job.

## Inquiry Station

NOTE: Entries for the INQUIRY STATION  
originate with the "User Comment and  
Suggestion Form," which is available  
at the Information Desk and in the  
Consulting Office.

Question: What is a warm start?

Reply: The 50-75 System can go down  
for a variety of reasons. If the  
error is not too severe, it is pos-  
sible to perform a warm start to  
reactivate the system. This procedure  
allows all the operations that were in  
progress at the time the system went  
down either to continue from the point  
at which they left off, or to restart  
from the beginning. Thus, a job that  
was being printed at the time of the  
system error, would finish printing  
after the warm start. If the system  
error is severe, then a cold start is  
necessary. This latter procedure re-  
quires that all jobs that were in the  
system when it went down be reloaded  
into the system. Cold starts are very  
rare; the last one happened over five  
months ago.

Question: If you use the Linkage  
Editor, the computer does not tell you  
how much core you have left to expand  
your program. Can this be remedied?

Reply: A program has just been com-  
pleted by a member of our programming  
staff which will allow anyone using  
the Linkage Editor to be able to  
estimate the amount of core he has  
left. A writeup concerning the use of  
this program will be available in the  
very near future.

Question: Why is the standard CalComp  
paper only 10 inches wide? It would  
be much more convenient if it were at  
least 12 inches and a lot better if it  
were 15 inches wide.

Reply: CalComp paper is relatively  
expensive and the Service Area has  
attempted to use the size of paper  
which will meet the needs of the  
majority of our users and will still  
not be too costly. The standard  
paper we now use, for example, costs  
approximately five dollars a roll,  
while the special 30 inch paper we  
also supply is about twenty dollars  
per roll. It is generally felt that  
most of our users would not care to  
pay the necessary additional charges  
were we to make 15 inch paper our  
standard.

Suggestion: I would like to suggest  
that you include in the ASP job sta-  
tistics appearing on the last page of  
output the number of bytes of main  
storage actually used by the job. The  
IBM 360 System at Argonne has this  
feature and they maybe able to furnish  
particulars. This would allow for  
better region requests to be made the  
second time a job is run.

Reply: Thank you for your suggestion.  
A member of our programming staff is  
currently contacting the Argonne  
National Laboratory and, if possible,  
we hope to be able to implement your  
suggestion in the near future.

Complaint: When the department man-  
ages to lose three programs in one  
week, that is just too much to take.

Reply: There are many possible rea-  
sons why your output may have been  
lost. If, for example, a warm start  
had occurred during your job, then it  
is possible that your output was never  
printed. It is also possible that  
your printed output was left attached  
to the job printed just prior to  
yours. This latter case is clearly an  
operator error, while the former  
condition can occur without the  
operator's knowledge. There are other  
factors which may account for lost  
output, and I would suggest that you





see the consultants the next time such a problem arises. They are frequently able to trace a lost job and discover what became of it.

## Research and Development

### Language Conversion Facilities

Programs are currently available for converting from COBOL or FORTRAN to PL/I.

LCPCOB accepts as input a COBOL source program and produces a PL/I source program listing and optional PL/I source deck. The Consulting Office has a manual (C33-2001) describing the use and limitations of this facility. A catalogued procedure, LCPCOB, is also available which will easily handle 200 COBOL statements.

LCPFORT is available to assist those interested in converting from FORTRAN to PL/I. From a FORTRAN source deck, this program produces a PL/I source program listing and deck in addition to a list of assumptions made during the translation. A catalogued procedure is also available for the use of this facility.

Anyone interested in the use of either of these programs is invited to ask in the Consulting Office for additional information.

### IBM 1800 Paper Tape to Card Conversion

A new system routine called TTAPE on the IBM 1800 Reads Paper Tapes and converts the data to EBCDIC card images which may then be printed or punched. TTAPE accepts only ASCII code, which is produced by teletypes similar to PL/RTS terminals. Since this routine uses the optical paper tape reader, it is necessary to use black or opaque tapes. Further information concerning the use of TTAPE is available in the Consulting Office.

### UILOADER

Users of UILOADER who are uncer-

tain as to the amount of memory to estimate for the REGION= parameter on their /\*ID card should consult 360 Notice No 1219, available in the Consulting Office.

Users are also strongly urged to avoid the /\*DATASET technique of passing object decks to UILOADER. The following method is recommended:

```
//GØ.SYSDECK DD *
                                <Object Deck>

/*
//GØ.SYSIN DD *
                                <Data Deck, if Needed>

/*
```

This technique, which overrides a statement in the catalogued procedure, is necessary due to an upcoming modification to UILOADER.

### LSQFIT Withdrawn

The program LSQFIT in LINKLIB no longer works due to the change over to MVT and is being permanently withdrawn from the system. There are two other least square routines available: WLSQZ in the University of Illinois Mathematical Subroutine Library, and LLSQ-DLLSQ in the IBM Scientific Subroutine Package.

### MVT SYSTEM PROBLEMS

The following system problems have been encountered since the installation of the new ASP-OS/MVT System.

#### 1. COMPLETION CODE SYSTEM=522

This can be caused by various situations in which a tape is dismounted during a job and then an attempt is made to access it later. Rather than state all of the cases where this can happen, it is recommended that all users code:

```
VØL=(,RETAIN,SER=label)
```

for all JCL cards referencing tapes. This can also happen in other situ-



ations, and at times it can be a system error. Users are urged to bring these cases to the Consulting Office, Room 169 DCL.

## 2. IEF247I ALLOCATION RECOVERY

JOB CANCELLED BY OPERATOR

for a disk or tape that has previously been properly setup. This is a SYSTEM ERROR and is being investigated by the programming staff. Reruns usually work and RELLOADS can be obtained in the Consulting Office. A notice will be posted when a solution to this problem is found.

## 3. VOLUME \_\_\_\_\_ NOT MOUNTED

for a disk pack that has been properly setup and allocated. This is a known error with the present version of ASP and will be corrected in a later version. As above, reruns frequently work and RELLOADS can be obtained in the Consulting Office.

### Program PDSPRINT

PDSPRINT prints the directory of a partitioned data set and prints the members themselves in the order in which they appear in the directory, (alphabetical order). The program can print the directory of any partitioned data set, but the members themselves can be printed only for a data set with logical record length= 80 bytes, i.e., a card image data set. In the printing of the directory, each member name is followed by a list of its aliases. Each alias also appears in the list, flagged by an asterisk and followed by the member name of which it is an alias.

#### Program Usage

```
// EXEC PGM=PDSPRINT[,PARM=MEMBER]
//DD1 DD DSNAME=library-name,
// [UNIT=unit,VOL=SER=volser,]DISP=SHR
//DD2 DD DSNAME=library-name,
// [UNIT=unit,VOL=SER=volser,]DISP=SHR
```

```
//SYSPRINT DD SYSOUT=A
```

The UNIT and VOL parameters on the DD cards above may be omitted if the data set is catalogued. If the optional parameter PARM=MEMBER is omitted, only the directory is printed. If it is used, the contents of the members are also printed.

#### Catalogued Procedure Usage

```
// EXEC LISTPDS,DSNAME=
'library-name[,UNIT=unit,VOL=SER=volser]'
```

## Miscellaneous

### PLORTS Compiler

From time to time we receive requests from users of PLORTS to insert additional features into the PLORTS software system. Generally, these suggestions are valid and, if inserted, would result in an improved PLORTS. However, they do take the time of a programmer, time which is at a premium. At present, the efforts of the PLORTS software group are being concentrated in two areas: 1) the day-to-day maintenance, when required, of the present PLORTS; and 2) the PLORTS Compiler which, when completed, will hopefully contain most of the suggestions presently being received. This is not an attempt to discourage the submission of such requests, but rather to indicate why they cannot immediately be implemented into PLORTS when they are received.

### 360 Mnemonics, Revised

|     |                       |
|-----|-----------------------|
| STC | Step To Card          |
| SP  | Scatter Print         |
| BCR | Backspace Card Reader |
| ED  | Eject Disk            |
| ST  | Switch Tracks         |
| SD  | Scatter Disks         |
| SR  | Scramble Registers    |



## 5

5

5

5

5

5

5





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The University Mailing List which includes all administrative personnel from  
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The ILLINET OUTPUT mailing list.

For additions or deletions to the ILLINET OUTPUT Mailing List, please return this  
complete page to Editor, ILLINET OUTPUT, 127 DCL.

Please (include, delete) my name for the ILLINET OUTPUT Mailing List.

Name-title: \_\_\_\_\_

New Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

For change of address please indicate old address, unless it is printed below:

\_\_\_\_\_

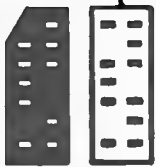
\_\_\_\_\_

\_\_\_\_\_



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# *Illinet Output*

University of Illinois at Urbana-Champaign.....Department of Computer Science

Vol. 2, No. 1.

UNIVERSITY OF ILLINOIS

January 1970

FEB 16 1970

## Notice Board

### System Reconfiguration

The System/360 hardware reconfiguration originally planned for August 1969, is now scheduled for early February 1970. Although this includes removal of the model 50 computer, software modifications will be minimal, and users can expect little or no change to the existing programs. Software will continue as ASP version 2.3 and OS/360 release 17 MVT.

The new configuration will allow users access to 7-track and 9-track 800 bpi tapes via /\*SETUP cards, and the amount of 360/75 core storage available will be increased from the current limit of 348K to approximately 400K. In addition, a third system residence disk (UISYS3) will be present; this disk will contain some space for temporary data sets.

These and other items will be outlined in more detail with 48-hour notices posted during the conversion process.

### TTY Repair Service

The Service Area of the Department of Computer Science announces a Teletypewriter Repair Service. The teletypewriter repair service consists of maintenance, repair, preventive maintenance, overhaul, and installation of Teletype Corporation models KSR33, KSR35, ASR33, and ASR35.

Maintenance means the cleaning, oiling, adjusting, and testing re-

quired occasionally on teletypes to insure proper operation.

Repair means the actual replacement of worn or broken parts of the teletype equipment.

Preventive Maintenance (at customer request) means the occasional testing, oiling, and adjusting suggested by Teletype Corporation as a useful attempt to extending the life of the teletype.

Overhaul is the actual disassembly and reassembly (with new parts) of the mechanics of the teletype in order to restore it to proper operation.

Installation means the initial unpacking, assembling, connecting, and testing of a new teletype when it arrives from Teletype Corporation.

The Teletypewriter Repair Services will be offered from the hours of 0800-1200 and 1300-1500 daily Monday through Friday, with the exception of holidays or other times when the Department of Computer Science is closed. Calls received after 1500 hours will be serviced the following day.

All calls should be made directly to Mrs. Bonnie Johnson, Room 185, DCL, phone 3-0969. The caller should give his name, phone number, room and building (location of teletype), model and serial, inventory number, account title, code number, and department. If this information is not supplied or

## LIBRARY



EDITOR . . . . . Nick Smith

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Department of Computer Science, Uni-  
versity of Illinois at Urbana-  
Champaign, Urbana, Illinois 61801.

if calls are made to other numbers, no  
response can be given the requests.  
All calls will be handled on a "first-  
call, first-served" basis.

The charges for this service will  
be divided into two parts--

labor by the hour --- \$5.10/hour  
repair parts --- Cost + 10%

#### Class Numbers Expire

All class Problem Specification  
numbers active during the fall se-  
mester of 1969 will expire on February  
14, 1970. These numbers may not be  
used after this date. Instructors who  
will need a class number for the  
spring semester 1970, may obtain one  
by submitting a Problem Specification  
Form. These forms are available at  
the Information Desk.

#### Faculty Short Courses

During the spring semester, the  
Service Area will again offer an ex-  
panded series of non-credit, no-fee  
short courses to aid the users and  
prospective users of the IBM  
System/360. The courses are open to  
all faculty, staff, and graduate  
students. Practical exercises and  
applications using the 360 computer  
will be emphasized during the 6-week  
period of the instruction beginning  
March 9 - April 23. (No classes will  
be held during Spring Vacation week of  
March 30.) Each course will meet for  
2 sessions per week: a 1-hour lecture  
period and a 2-hour discussion/work-  
shop period, for a total of 3 hours  
per week. Those interested should  
complete the form contained on the  
last page of this newsletter and  
return it not later than February 13  
to: Rosalyn Munds, 173 Digital  
Computer Lab., 333-0969.

Assignment to one of the course  
sections will be made according to  
preferences indicated on the appli-  
cation form and availability of space  
and instructors. Each course will be  
limited to 50 students. Questions or  
comments concerning these courses may  
be directed to Robert Skinner, 195  
Digital Computer Lab., 333-6145.

1. FORTRAN IV LANGUAGE. Prior  
programming experience is not re-  
quired. Knowledge of High School  
Algebra is sufficient mathe-  
matical preparation. The course  
will include an introduction to  
computing systems and pro-  
gramming, FORTRAN IV language and  
syntax, applications, and the use  
of IBM System/360. Several pro-  
gramming problems will be pre-  
sented.

2. 360 ASSEMBLY LANGUAGE. Knowl-  
edge of a programming language is  
recommended, preferably FORTRAN.  
The basic course will include an  
introduction to IBM System/360,  
control language statements  
(JCL), syntax, use of assembly  
language statements, and  
applications and practical prob-  
lems on IBM System/360. The  
intermediate course for those who  
already have a basic familiarity  
with assembly language, will  
include extended features such as  
macros, input-output, and program  
optimization. For example, a  
general understanding of the fol-  
lowing program makes one eligible  
for section B, the intermediate  
course:

#### TEST START

```
*
*      CAN YOU GET TO SECTION B?
*
BALR    12,0
USING   *,12
LA      1,=C' THIS PROGRAM'
CLC     ABILITY,0(1)
BC      10,SECTIONB
```

SECTIONA EQU \*

SECTIONC EQU \*



B \* (I JUST DON'T UNDERSTAND)

SECTIONB EQU \*

\*

\*

CONGRATULATIONS!

\*

SVC 3 (DON'T WORRY ABOUT THIS!)

ABILITY DC C'MY PROGRAMMING ABILITY'

END

3. ASP-JCL-UTILITIES. This course is designed for the current or prospective IBM 360 users who would like to utilize the IBM System/360 resources fully. Working knowledge of a programming language is essential. Course will include a systematic discussion of OS/360 Data Management and JCL (Job Control Language). The use of IBM System/360 Utility Programs and ASP (Attached Support Processor) statements will be presented in practical examples and course problems. Storage requirements and timing considerations will be discussed.

You will receive written confirmation of your course request the last week of February. At that time you will be notified what text, if any, will be used in the course.

In addition to the above Faculty Short Courses, the SOUPAC group, the Statistical Consultants of the Department of Computer Science, will be offering a non-credit course to introduce new users to the potential of the SOUPAC collection of statistical programs and to give old users an opportunity to learn more about the use and power of SOUPAC. The course will consist of eight to fourteen weekly lectures given on Wednesday nights 7 to 9 P.M. starting February 18, 1970, in room 151 Electrical Engineering Building. Emphasis will be on the mechanics of writing and using SOUPAC programs with assignments being made and machine time provided. The course will be open to faculty, staff, and graduate students. To enroll, contact the SOUPAC office, 138 DCL -- phone 333-2170.

## Inquiry Station

NOTE: Entries for the INQUIRY STATION originate with the "User Comment and Suggestion Form," which is available at the Information Desk and in the Consulting Office.

Suggestion: Make a short write-up on how to read an MVT core dump.

Reply: This idea has been under consideration by the Consulting Group for some time. Reading an MVT core dump is sometimes rather complex, however, and at present, no satisfactory method of producing a handout which is both readable and comprehensive has been found. Since the process is easier to illustrate than it is to describe, I would suggest that you see the Consultants. They will be glad to show you how to read a dump, and currently this is the only alternative solution to your problem.

Suggestion: You should provide for a separate category of HOLD on ID card for 1800 users, so that when jobs that are in HOLD are released the system checks to see if they are in HOLD because of Special Plot, or PS 1000, or because the user wants to have it in HOLD for a specific purpose and not released until he himself allows for it.

Reply: Jobs are placed in HOLD under three different circumstances:

(1) Jobs with PS number 1000 are placed in HOLD by the system. These are released by the operator after midnight.

(2) Users who desire special CalComp ink, reversed forms etc., make written requests that their jobs be placed in HOLD so that the operator will have time to fulfill their requests. These jobs are released by the operator at his convenience.

(3) Jobs that contain the ID card parameter HOLD=YES are placed in HOLD by the system. These jobs are re-



leased by the user at some future time. They are not released by the operator. If you feel that one of your jobs has been erroneously released by an operator, you should see a Consultant.

Request: Please restore a working version of the FORTRAN H compiler to a permanently mounted disk. Level H with the OPT=2 option is your only efficient compiler and it is unreasonable to require a disk setup to use it.

Reply: A new version of FORTRAN LEVEL H has been placed on the system and SETUP cards are no longer needed. The present version allows for specification of either REGION=230K or REGION=348K. If either message:

compilation deleted 1.  
compilation deleted 3.

is received from specifying REGION=230K, users should change to REGION=348K. Other REGION parameters will not affect results.

## Research and Development

### System Error Corrected

In the past, any user who did not use DEFER for a CTC dataset caused all succeeding jobs to fail with the message:

DDNAME\_\_\_\_\_READ ON NONEXISTENT DATASET

Users must still specify UNIT=(CTC,, DEFER), but the system has been corrected so that the failure to do so will not cause other jobs to fail.

This message also appears as a result of the concatenation of ASP datasets with disk datasets. Since this restriction still exists within the present version of ASP, the message will continue to appear when this type of concatenation is attempted.

### New Disk Mapping Program

A test version of a new disk mapping program, DISKMAP, is now available to effectively replace MAPDASD. All useful information pertinent to a dataset is printed, including the member names of partitioned datasets, and the core size of each member if it is a load module. For more information on DISKMAP, users should consult 360 Notice No. 1249 or inquire about the program in the Consulting Office.

### MVT Timing Routine

The following subroutine has been added to the FORTRAN library and thus is callable from FORTRAN or Assembly Language:

QO-UØI-STIMEZ-6F-A

The routine replaces ITIMEZ for use with OS/MVT, and has three entry points. STIMEZ initializes a time interval, after which KTIMEZ will return the elapsed time and JTIMEZ will return the time left in the interval specified. A detailed write-up may be obtained by submitting the following job deck:

```
/*ID      <ID card information>
/*SETUP  UNIT=2314,ID=UIUSR4
// EXEC  SLWSRCH
//SYSIN  DD `*
STIMEZ
/*
```

The Consultants are available for assistance in using this routine.

### FØRTRAN Error Routines

On Sunday, December 14, 1969, the FØRTRAN error-handling routines were changed so that programs terminate on the first overflow, division by zero, etc., rather than on the tenth such error. This change causes the FØRTRAN error-handling routines to behave as they did before MVT was installed. The use of ERRSET and ERRTRA and the methods of obtaining memory dumps were not changed.





## Miscellaneous

### Programming Help

Members of the Consulting Group provide a programming service for users of the Service Area. Users are charged \$3.35 an hour for programming plus machine usage. Consultants are available to work at all levels of research programming. Interested users should inquire in the Consultant Office.

The Service Area also maintains at the Information Desk a register of people who are interested in part-time employment as programmers. Anyone interested in hiring a programmer or having his name added to the register should visit the Information Desk. The Service Area limits its involvement to supplying the names and work experience of available programmers. All working arrangements are to be made directly by the parties involved.

### Standing Keypunch

In direct response to a user request appearing in the November, 1969 issue of Illinet Output, an elevated keypunch was installed in the keypunch area on a trial basis early in December. This keypunch, which must be used while standing, is intended for users with only a few cards to punch. So far, it has proved successful in decreasing the amount of time users must wait for keypunches. A second such keypunch is currently being considered.

### Power Failure<sup>\*</sup>

Despite all its computing power and fancy displays, the model 75 is not so impressive during a power failure. It doesn't do anything. It just stops. There is no grinding, screeching halt of mechanical hardware; no death throes of a giant. Lights on the console go out all at once, not one by one. There is no final pulsation or ebbing to be seen.

However, even in the darkness the work of humans goes on. First, the operators must be sure that the power will stay up before they restart. Secondly, computer engineers check out the hardware before normal running. If something is wrong, greater damage may be caused by attempting to restart.

Sometimes, to complicate matters the air conditioning units fail. Without these massive coolers the temperature in the main room rises so rapidly that operators are forced to shut down in about ten minutes. Although a lot of checks are necessary, they are performed as quickly and efficiently as possible. So if the lights go on suddenly and the computer doesn't restart like a vacuum cleaner, please be patient.

\* Reprinted in part from Computing Centre Newsletter, University of Waterloo, Issue 1969-12.



# APPLICATION FOR FACULTY-STAFF SHORT COURSES

TO: Rosalyn Munds  
173 Digital Computer Lab.

Please Print

DATE 1 3 4  
NAME 5 20  
Dept. 21 25  
Position 26  
Mailing Address 27 60  
Phone 61 67

Do you prefer instruction to include examples from the field of Engineering?

Yes 80 No        Don't Care       

Please indicate your preference for the sections under the course you wish to attend in the following manner:

1st preference = 1

2nd preference = 2

3rd preference = 3

cannot attend = 0

March 9 - April 23 (No classes week of Mar. 30)

## FORTRAN IV LANGUAGE

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Section A Mon. 1 - 2 P.M., Wed. 1 - 3 P.M.

Section B Tues. 11 - 12 A.M., Thurs. 10 - 12 A.M.

Section C Mon. 7 - 8 P.M., Wed. 7 - 9 P.M.

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## ASSEMBLY LANGUAGE\*

72

Section A Mon. 9 - 11 A.M., Wed. 10 - 11 A.M.

Section B\* Tues. 1 - 3 P.M., Thurs. 1 - 2 P.M.

Section C Tues. 7 - 8 P.M., Thurs. 7 - 9 P.M.

\* (Section B is intermediate Assembly Language)

73

74

75

## ASP-JCL-UTIL

76

Section A Mon. 10 - 12 P.M., Wed. 11 - 12 P.M.

Section B Mon. 7 - 9 P.M., Wed. 7 - 8 P.M.

77

78





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The ILLINET OUTPUT mailing list.

For additions or deletions to the ILLINET OUTPUT Mailing List, please return this  
complete page to Editor, ILLINET OUTPUT, 127 DCL.

Please (include, delete) my name for the ILLINET OUTPUT Mailing List.

Name-title: \_\_\_\_\_

New Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

For change of address please indicate old address, unless it is printed below:

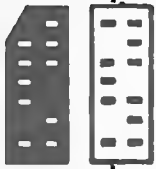
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



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# Illinet Output

University of Illinois at Urbana-Champaign----- Department of Computer Science

Vol. 2, No. 2

February, 1970

UNIVERSITY OF ILLINOIS

## Notice Board

MAR 23 1970

### LIBRARY

#### New Rate Structure

Except for the 360/75 CPU charges, the present rate structure for computer services has been in effect since July 1, 1968. The individual charge for each function was determined by dividing the direct and indirect costs of providing that function by the usage of the function. Assigning the costs to each function is fairly straightforward, but accurately forecasting usage is difficult, and usually depends on the accumulation of data on past usage. When the MVT system was inaugurated in October, 1969, the 360/75 CPU charge was further complicated, in that elapsed real time on the CPU could no longer be considered, but instead CPU time actually used, the amount of core used, and the number of I/O requests had to be considered. Once a satisfactory formula for 75 CPU was determined, the factors applied to that formula were deliberately set low (as stated in announcement No. 1200, September 30, 1969) so that there would be no chance that the user would be overcharged while reliable usage information was being gathered.

Usage data is now available with which to calculate new rates for each computer service function. Four months of data on the 360/75 CPU operating under MVT, and 19 months of data on the other functions, have given us the necessary information to revise the rate structure so that it more accurately reflects the costs of operating the IBM 360 service complex.

Therefore, on March 1, 1970 the following rate charges will become effective:

1800 CPU Time - \$50.00 per hour  
Cards Read - \$ 2.10 per thousand  
Cards Punched - \$ 5.75 per thousand  
Lines Printed - \$ 0.80 per thousand  
CalComp Plotter - \$30.00 per hour  
360/20 - \$26.00 per hour  
Service Key punch - \$ 2.35 per 100 cards  
Service Programming - \$ 3.35 per hour  
75 CPU - cents charged =  $0.08(a+b)$

where:

a = CPU time actually used in centi-seconds (.01 sec.)  
b = number of I/O requests

Re-evaluation of the entire rate structure will again be made over the next several months. However, it is difficult for us to assess the overall effect of specific changes in the rate structure on individual users. Users are, therefore, urged to compare the costs which will be incurred under the new rate structure with those incurred under the past system. Your experience will help us in the formulation of policy regarding charges for the coming year.

#### Core Testing Routine Now Available

EXC/RZ, an excess core testing routine for use with the Linkage Editor, has been added to the FORTRAN subroutine library. This routine allows FORTRAN and Assembly Language users to determine how much unused core they have in their REGION when their program is executing. A preliminary write-up for the use of this routine is available in the Consulting Office, 169 DCL.





EDITOR . . . . . Nick Smith

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---

### Core Dumps for Calcomp

The optional parameter DUMP=YES has been added to the Calcomp parameter list. Calcomp users who specify DUMP=YES in the PARM field of their EXEC CALCOMP card and also include a GO.SYSUDUMP card will receive a dump if their program is terminated for any ILCxxxx FORTRAN errors or for any Calcomp errors. This parameter serves the same purpose as specifying PARM.GO=DUMP for a non-Calcomp job.

```
// EXEC CALCOMP,PARM='PG-36,DUMP=YES'
//GO.SYSUDUMP DD SYSOUT=A
//GO.SYSIN DD *
      <data cards>
/*
```

### **Inquiry Station**

Suggestion: At the system reconfiguration, hook the 7-Track tape unit into the 75 OS/360. There are many jobs (I personally have 30 ten minute production runs planned) which have input data recorded on 7-Track tape because the instrument which digitized the data (e.g., from an experiment) had a 7-Track unit. Moreover, it seems to me that the elimination of tape-to-tape jobs to convert 7-track to 9-Track would alleviate the load on ASP, which is purportedly the big bottleneck right now.

Reply: Thank you for your suggestion. The 7-Track tape unit will be hooked into the 75 upon the removal of the IBM 360/50.

Suggestion: Modify OS/360 and ASP so that jobs are scanned for JCL errors as soon as they are loaded into the system and so that the system pro-

cesses with high priority and prints out SYSMSG for those jobs that have JCL errors and consequently won't run. This would help users considerably when turnaround time is long, as it has been recently, in eliminating the discouragement of waiting a day for a job only to find out it did not even try to run due to a JCL error.

Reply: To implement the feature you suggest would require major modifications to OS and ASP. When new releases and/or fixes are received from IBM, any local modifications previously made to ASP and OS serve to increase the difficulty encountered in installing these releases and fixes.

At present, we are designing our own system to replace ASP. Once this has been accomplished, such suggestions as you have made stand a much better chance of being implemented without the problems that now result when such implementations are made with our present system. As an interim solution, the consultants are available to help precheck your JCL before your jobs are submitted. This should help to alleviate some of the delay in debugging programs.

Question: Why can't the CalComp "GO" step yield a dump as readily as the FORTRAN "GO" step?

Reply: Thank you for calling this problem to our attention. The necessary software changes have been made so that specifying DUMP=YES in the PARM field on the EXEC CALCOMP card should produce the desired results.

See the article intitled "Core Dumps for CalComp" in this issue of Illinet Output for further information.

REMARK: In the January, 1970 issue of ILLINET OUTPUT a user requested a write-up on reading an MVT core dump. Although it was recommended that users see the Consultants about interpreting dumps, it was not mentioned that the IBM manual Programmers' Guide to Debugging (C28-6670) is devoted entirely to reading dumps. This manual is



often difficult to interpret, however, and is, therefore, of use primarily to the more sophisticated programmers.

## Research and Development

### Using SSP with WATFOR

The FORTRAN Scientific Subroutine Package (FORTRAN SSP) has recently been changed so that each subroutine now has a \$ENTRY card at the end. This enables the use of the SSP dataset as a WATLIB for WATFOR programs. For users planning to try this feature, it is important to remember the warning given by 360 Notice 1227, stating that some of the SSP routines may not compile under WATFOR without getting errors. If this happens, it is suggested that the program be taken to the Consulting Office. 169 DCL, and the consultants will attempt to change the SSP subroutine so that WATFOR will compile it. The procedure for using the SSP routines as a WATLIB is as follows:

```
/*ID <ID card information>
/*SETUP UNIT=DISK.ID=UIUSR4
// EXEC WATFOR
//WATLIB DD DSN=SYS1.SSPLIB.FORTRAN,
                                DISP=SHR
//SYSIN DD *
$JOB
    <FORTRAN source program>
$ENTRY
    <data cards, if used>
$STOP
/*
```

Addition of the \$ENTRY cards will not affect the existing SSP Library Control Programs SSPPROG and SSPSRCH. Any questions regarding this new feature should be directed to the Consultants.

### Loader Changes

In mid January, the system catalogued procedures referencing UILOADER were slightly changed. A second loader, written by IBM, is now available; the procedures have been

modified so that the user can easily choose which loader he wants. Users who have private catalogued procedures referencing UILOADER should see Larry Chace, 173A DCL, for needed changes.

The two loaders are quite similar; there is no significant difference in speed between them. UILOADER "sprays" memory with a constant value to aid in program debugging, and makes available about 4K more memory than does the IBM loader. In addition, the PARM.GD=DUMP facility is present only with UILOADER. The IBM loader, however, can load PL/I and ALGOL programs, which UILOADER cannot do at present. Therefore, the following are the default choices:

```
UILOADER: FORTRAN, Assembler, COBOL
IBM loader: PL/I, ALGOL, RPG.
```

To specify the alternate loader in each case, the user should code the LOADER=parameter on his // EXEC card; for example, to compile a FORTRAN program and then execute it via the IBM loader:

```
// EXEC FORTLDG0,LOADER=IBM
//FORT.SYSIN DD *
    <source program deck>
/*
```

### FORTRAN Compilers

The following is a short description of the most efficient uses for the various FORTRAN compilers. These descriptions are particularly useful when deciding on the compiler that best fulfills your particular needs.

WATFOR Initial debugging, limited execution, small sample problems, short running input-output bound production jobs.

FORTRAN G Intermediate debugging, checkout of larger sample problems, overlays.

FORTRAN H-OPT=2 Routine production, no debugging, leading to the use of object decks and/or disk stored load modules.





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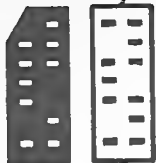
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Vol. 2, No. 3

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AT URBANA-CHAMPAIGN

## Notice Board

### Stand-Alone 360/75

The stand-alone 360/75 system is now in operation. Although the software is essentially the same as that on the 360/50-75 system, there are some minor differences which are outlined below.

SORT/MERGE users can now receive the SORT/MERGE message log along with their regular output. To properly format this output, users should include

```
/*FORMAT PR,DDNAME=SYSOUT,CONTROL=SINGLE
```

with their SORT/MERGE jobs.

Users may now specify a REGION parameter of up to 400K on their jobs. Note however, that jobs with region requirements exceeding 348K will be run no more than once per day.

Standard REGION sizes in the new system are 60K, 116K, 232K, 348K, and 400K. Those who are now specifying REGION=230K are particularly urged to use REGION=232K.

Users with 9-track, 800 bpi tapes may now access their tapes directly with the /\*SETUP facility. The proper /\*SETUP format for 7-track tapes is:

```
/*SETUP UNIT=TAPE7,ID=(options)
```

and for 9-track 800 bpi tapes is:

```
/*SETUP UNIT=TAPE8,ID=(options)
```

Job Control Language statements allocating such tapes should use UNIT=TAPE7 and UNIT=TAPE8 respectively. 7-track users should be especially aware of the DCB= subparameters which are almost always

required on DD statements referencing 7-track tapes.

The new system resides on the 2301 drum and three 2314 disk packs. The new system volume is named UISYS3 and (like its counterparts UISYS1 and UISYS2) it contains a large amount of unused disk space. Users with job steps referencing many temporary data sets should confirm that these data sets are being allocated evenly across the three packs.

### PS and Account Information Forms

Version 4 of the Account Information Form and Version 5 of the Problem Specification Form have been released.

Since the earlier forms contained changes that resulted in a rearrangement of the different fields when keypunched on cards, no attempt was made to restrict the version accepted by the Department of Computer Science. The fields indicated on the new forms are now consistent with the fields that are accepted by the accounting system. To continue to accept all four versions of the Account Information Form and all five versions of the Problem Specification Form would only cause confusion and delay in the processing of these forms.

Therefore, only Version 4 of the Account Information Form and Version 5 of the Problem Specification Form are





EDITOR . . . . . Nick Smith

Published ten times yearly by the  
Department of Computer Science, Uni-  
versity of Illinois at Urbana-  
Champaign, Urbana, Illinois 61801.

now acceptable for processing.

Many users keep blank copies of these forms on hand to save themselves a trip to DCL when a form is needed. These old forms may be replaced by calling 3-6465 and requesting that copies of the new versions be forwarded through campus mail.

## Inquiry Station

NOTE: Entries for the INQUIRY STATION originate with the "User Comment and Suggestion Form," which is available at the Information Desk and in the Consulting Office.

Suggestion: Include PLØT on the FØRTRAN library.

Reply: PLØT will be included on the SSP FØRTRAN tape as soon as possible. Thank you for your suggestion.

Question: Would it be possible to get narrow paper for the 360/20?

Reply: We have discussed the possibility of narrow paper for 360/20 listings at great length. Because of inventory problems, we are reluctant to stock two sizes of paper. However, we have made a "Request for Price Quotation" on regular size printer paper with perforations that would allow the paper to be reduced in size to a narrow paper. Once we have these price quotations, we will again consider the problem of narrow paper for the 360/20.

Complaint: Your new rates are going to price us out of business. The cost of living is peaked at a 6% per annum rise, which is peanuts compared to the recent increases. Please consider

the establishment of a low-cost, low priority category for user production runs.

Reply: The primary factor motivating the recent rate increase was the need to cover the operating expenses of the Service Area. Hardware rental is the greatest expense and cannot be reduced even by turning the machines off on the weekend. For the Service Area to provide a low-cost, low priority category and still meet its operating expenses, it would be necessary to increase the rates still further for all other users. In order to be as equitable as possible, therefore, it is not considered feasible at this time to establish such a category.

## Miscellaneous

### Time Refunds

Refunds of time may be obtained for computer time lost due to machine or system error. All applications for refunds must be handled through the Consultants and will be considered only under the following conditions:

- 1) All applications must be accompanied by all original, unaltered materials pertaining to the run-for example, the input card deck, the output listing, etc.
- 2) Application must be made within one week after the job was run.
- 3) It must be clearly shown that the run failed due to errors in the operating system, to malfunctions of the computer hardware, or to errors on the part of the operating or consulting staff.



## USER LIBRARY

TO: SERVICE AREA USERS

Would you be interested in contributing programs to a user "pot-luck" library? The SERVICE AREA is considering establishing a "pot-luck" library where users could submit programs which they felt might be reasonably useful to other programmers. The programs and their write-ups would be made available to all users, although the SERVICE AREA would assume no responsibility for the maintenance of the programs. If you would be interested in contributing to the library, please complete this page and leave it in the CONSULTANT OFFICE, 169 DIGITAL COMPUTER LABORATORY.

| NAME | PHONE | DEPARTMENT | NUMBER AND<br>NATURE OF<br>PROGRAMS YOU<br>HAVE TO<br>CONTRIBUTE |
|------|-------|------------|--|
|------|-------|------------|--|





## MAILING LIST

The ILLINET OUTPUT is automatically sent to all persons on the following Mailing Lists:

The University Mailing List which includes all administrative personnel from  
Department Heads to the President.

The ILLINET OUTPUT mailing list.

For additions or deletions to the ILLINET OUTPUT Mailing List, please return this  
complete page to Editor, ILLINET OUTPUT, 127 DCL.

Please (include, delete) my name for the ILLINET OUTPUT Mailing List.

Name-title: \_\_\_\_\_

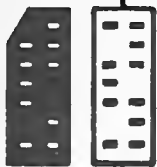
New Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

For change of address please indicate old address, unless it is printed below:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Gift and Exchange  
220A Library  
5 Copies



# *Illinet Output*

University of Illinois at Urbana-Champaign-----Department of Computer Science

Vol. 2, No. 4

April, 1970

## Notice Board

### New Rate Structure

On February 4, 1970, 360 Notice No. 1266 was issued concerning rates for computer service. In brief, it was stated that the prior rate structure did not recover full costs and that a new rate structure would become necessary. It was also stated that re-evaluation of the entire rate structure would continue and would be made over the several months following.

In this connection, the department solicited the advice and counsel of the Computer Policy Committee of the Graduate College. A subcommittee of this group scrutinized the entire costing procedure of the service facility in order to be in a position to suggest a rate structure which would allocate the costs of the various service functions over the various classes of users of those functions in as equitable a manner as possible.

In accordance with these recommendations, the following new set of rates will take effect May 1, 1970.

Handling Charge - \$1.00 per job submitted

Disk/Tape Setup - \$1.00 per volume mounted

Disk space on UIUSR1 and UIUSR2 - \$0.0065 per authorized track per day

Cards Read - \$1.40 per thousand

Cards Punched - \$3.90 per thousand

Lines Printed - \$ .80 per thousand

CalComp Plotter - \$20.00 per hour

360/20 - \$17.75 per hour

Service Key punch - \$1.80 per 100 cards

Service Programming - \$2.45 per hour

1800 CPU Time - \$50.00 per hour

75 CPU - cents charged =  $0.04 \cdot (a+b) \cdot (0.0045c + 0.5)$

where:

a = CPU time actually used in centiseconds (.01 sec.)

b = number of I/O requests

c = core size in kilobytes - value given for REGION parameter on ID card.

It should be stressed that this still further change in the rate structure is based upon the desire to distribute charges for computing service more equitably. However, it is difficult for us to assess the overall effect of specific changes in the rate structure on individual users. Users are, therefore, urged to compare the costs which will be incurred under the new rate structure with those incurred under the past systems. Your experience will help us in the formulation of policy regarding charges in the future.

### AMOS 3.1 User's Guide

The AMOS 3.1 User's Guide is now

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UNIVERSITY OF ILLINOIS  
AT URBANA-CHAMPAIGN





EDITOR . . . . . Nick Smith

Published ten times yearly by the Department of Computer Science, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801.

available in the Consulting Office. Functions described in this manual are now in effect except for those outlined in section 3-04.

Usage of facilities described in section 3-04 must first be cleared with Rick Wells, 193 DCL, since the "/SETUP UNIT=1800" feature is not yet operational.

Users of CAIØ and TPIØ will be required to modify their programs under the new version and should consult section 3-07.

It is suggested that AMOS users read the entire 3.1 User's Guide very carefully, since the AMOS 3.1 system differs in many ways (both subtle and obvious) from its predecessor.

### New Handouts

Several new handouts are now available in the Consulting Office.

#### SERVICE AREA

##### Charges and Optimization Hints

(1-03) - describes various techniques and hints for users of FORTRAN, PL/I, and Assembly Language

#### I.B.M. SYSTEM/360-75

Linkage Editor (2-31) - describes use of permanent program and subroutine libraries on user or owner disk packs

UOI Utilities (2-51) - describes procedures set up for various Input-Output functions

PL/I (2-13) - describes the PL/I compiler control cards and options

CØBØL-ALGØL (2-14) - describes control cards for CØBØL and ALGØL

ASP (2-02) - describes ASP control cards and briefly discusses the functions of ASP

#### MANUALS

Assembler G Programmer's Guide (new version).

Other handouts that have been available for some time are:

#### CONTROL CARDS

ID Card (2-01)

#### COMPILERS

WATFOR (2-10)

FØRTAN G-H (2-11)

FØRTAN G-H Error Routines (2-12)

Assembly Language F-G (2-20)

Assembly Language F-G I/O Macros (2-21)

#### SUBROUTINE LIBRARIES

CALCOMP (2-40)

UOI Mathematical Subroutine

Library (2-41)

IBM Scientific Subroutines (2-42)

## Research and Development

### Changes to UILØADER

In March a new version of UILØADER (2.7) was placed on the system. This loader reflects two changes: (1) the optional parameter NØMAP may be given to suppress printing of the names and addresses of loaded routines. (2) the loading statistics will be given in both decimal and hexadecimal. The loading and executing of programs are not changed in this new loader.

### PS# Checking on PLØRTS

In March a new version of the PLØRTS system was incorporated into the 360/75. This new version allows only currently active problem specification numbers to be logged in through the PLØRTS terminals. Whenever the problem specification number typed in is inactive, this message will be printed on the terminal:

PS# INACTIVE OR INVALID

A problem specification number is considered inactive on PLØRTS for the same reasons it is inactive on the 360 (number expired or out of money, account number cancelled or out of funds, etc.). If anyone is no longer recognized by PLØRTS and receives the above message, he should contact the Consulting Office, 169 DCL.



### Correction To Line Counting

In the past the number of copies of printed output was not considered in determining when a user's line estimate had been exceeded. This was corrected late in March so that all lines of all copies of printed output are now charged against the user's line estimate. As before, users must pay for all lines of output generated.

### Proper WATFOR Use

Recent observations have shown that many users are utilizing WATFOR improperly by not being aware of the fact that, although WATFOR is an extremely fast compiler, WATFOR-compiled programs execute very slowly.

As a rule-of-thumb: If your WATFOR program gets an S322abend with a 2-minute CPU estimate, you should switch to FORTRAN G instead of merely increasing your CPU time estimate for WATFOR.

As an example of this phenomenon: Once upon a time, there existed a FORTRAN program which required in excess of 35 CPU minutes to execute, using WATFOR. The same program ran to successful completion in less than 3 minutes, using FORTRAN G.

### FØRMAC

FØRMAC, short for FORMula MANipulation Compiler, is a system for carrying out formula manipulations on mathematical expressions. It allows for the use of analytic as well as numeric techniques on a digital computer. Since FØRMAC is embedded in PL/I, the facilities of PL/I are available for program structure, loop control, I/Ø, etc. However, the user need know only a small part of PL/I in order to communicate effectively with FØRMAC.

A copy of the PL/I FØRMAC documentation is available in the Consulting Office, 169 DCL.

## Miscellaneous

### User Purchase of Peripheral Equipment

Occasionally, a user or a group of users will decide to purchase special equipment for generating input data to a computer. Their intention is to generate data to be processed on the IBM 360/75 at this installation.

When the purchase of data generating equipment is being considered, it is strongly recommended that the Chief Consultant, Room 169 DCL be contacted before making a final decision. There have been situations when such purchases have been made without prior consultation, which have resulted in incompatibilities between the purchased equipment and the 360/75 system. These incompatibilities have usually been re-resolved, but not without frustration and added expense for both parties. In most of these cases, these problems would have been minimized if the Chief Consultant had been contacted prior to the final decision to purchase the equipment.



### 360 Schedule of Operations

In the absence of serious hardware or software difficulties which require a deviation, the System /360 will observe the following schedule of operations:

[illegible]

The notation "Batch and PLORTS" implies that the PLORTS timesharing system will be run, unless there are very serious system problems which require a deviation from the schedule.

The notation "Batch," without "PLØRTS," implies that PLØRTS will be run if possible. However, it may not be running, for various good reasons.

\*On the first Friday of each month, Friday is changed to:

|              |              |
|--------------|--------------|
| 12:00 - 7:00 | Batch        |
| 7:00 -12:00  | Sched. Engr. |





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complete page to Editor, ILLINET OUTPUT, 127 DCL.

Please (include, delete) my name for the ILLINET OUTPUT Mailing List.

Name-title: \_\_\_\_\_

New Address: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

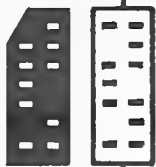
For change of address please indicate old address, unless it is printed below:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Dean R. B. Downs  
222 Library





# Illinet Output

University of Illinois at Urbana-Champaign-----Department of Computer Science

Vol. 2, No. 5

May, 1970

## Notice Board

### Job Status Inquiry Facility

Users having PLORTS timesharing terminals or 12-button touch-tone telephones may now inquire directly about the status of their job. The touch-tone telephone number is 333-4009. This number connects through a special dataset into the PDP7 time-sharing system.

When the phone rings, the PDP7 will answer it and respond with a single tone. After hearing this tone, the user should enter the 7 digits of his job number, followed by a number symbol. The computer will respond, usually instantly, with one of several possible sequences of tones, indicating:

the job has not been loaded,  
the job is in the system  
the job is out of the system (i.e., complete)  
timesharing is off  
you are to wait  
the number entered is not a valid job number  
ASP is not up.

The appropriate tone sequences associated with the above conditions are illustrated on the chart appearing on Page 5 of this issue.

At the present time only one line has been allocated to this service, and users may experience a high number of busy responses when accessing this facility. Two additional lines are on order, however, and will be installed as soon as possible. A touch-tone phone has been installed in the lobby

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of DCL.

Users with PLORTS terminals may make job inquiries by logging in on the terminal and entering the command:

JØB jobname

where "jobname" is the 8-character job number associated with the job. The response will be typed at the terminal.

This inquiry facility is expected to be more useful than the tape recorded "jobsout" list which is presently available. Therefore current plans call for the removal of the tape recording service as soon as a sufficient number of touch-tone telephones have been installed in the university to accommodate users' needs.

### New Job Numbering Scheme

A new job numbering scheme went into effect May 1, 1970. The new job name, consisting of a letter and seven digits, is organized as follows:

|                                      |                 |
|--------------------------------------|-----------------|
| letter                               | month (A-L)     |
| D1 }<br>D2 }                         | origin          |
| D3 }<br>D4 }<br>D5 }<br>D6 }<br>D7 } | sequence number |

The origin numbers (D1,D2) are as follows:



EDITOR . . . . . Nick Smith

## Inquiry Station

Published ten times yearly by the Department of Computer Science, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801.

|      |                        |
|------|------------------------|
| 00   | Plorts                 |
| 01   | Routing Room reader    |
| 02   | Machine Room reader    |
| 05   | Basic Computer Science |
| 2780 | terminals              |
| 99   | SWS                    |
| 98   | CE                     |
| 97   | CHEM                   |
| 96   | COMMERCE               |

The orange receipt cards show only the seven digit job number, which may be used in conjunction with the touch-tone inquiry facility to check the status of the jobs.

### 1800 Analog Facility

Until recently, the IBM 1800 connected to the System/360 was provided as an experimental service at the expense of the Department of Computer Science. Since this service has now been operating for some time, it was recently evaluated to determine whether it should continue as an integral part of the central computing service provided by this department.

As a first step in this evaluation, a committee of 1800 users met on April 27 to discuss the feasibility of obtaining the same service on some other university facility. The conclusions of this committee, along with statistical data on usage of the 1800, were then discussed with the Graduate College Computer Advisory Committee.

The outcome of these deliberations is a firm decision to include the 1800 (or some future successor machine) as a part of the central computer service provided to the campus by this department.

NOTE: Entries for the INQUIRY STATION originate with the "User Comment and Suggestion Form," which is available at the Information Desk and in the Consulting Office.

Suggestion: Set up a program library for users. Many departments and individuals are creating programs that others can use, but they do not know where to look to see if someone else has written one. I feel it would be worthwhile to set up a card file of programs which people have written so others need not duplicate efforts.

Reply: At one time the Service Area maintained a Potluck Library consisting of decks and write-ups for the ILLIAC II system. We have conducted a small survey to determine if such a library would be profitable for users of the IBM System/360. (The March issue of Illinet Output contained application blanks for submitting programs to such a library.)

Because of the limited user response and the difficulty of maintaining such a facility, however, we have decided to simply follow your suggestion and establish a program register. The Potluck Library Register for the IBM System/360 is now available in the Consulting Office, and contains those program descriptions submitted to us during the survey. Users may make their programs available by completing one of the Program Description forms kept with the register.

Complaint: A number of times the person who made the jobsout tape recording has not been understandable, mostly because of diction. I have on occasion, listened three or more times to the recording without determining whether my job was out.

Reply: We have continually had difficulty making the jobsout tape recording comprehensible and have reemphasized the need for distinct



enunciation to the personnel involved. We hope, however, that the touch-tone inquiry facility described elsewhere in this issue will provide a permanent solution to this problem.

Suggestion: The new acquisitions (books and periodicals) of the DCL library should be listed in every issue of the Illinet Output.

Reply: There is insufficient space in the Illinet Output to include all additions to the DCL library, which averages roughly 50 new volumes a month. Beginning with this issue, however, selected acquisitions will appear in the Illinet Output.

Complaint: Some of my CalComp jobs have been off by as much as 1/32 of an inch. I am sure it is the machine's fault and not my program's fault since on rerunning I get correct output.

Reply: Poor plots may be attributed to poor operator techniques in getting the plotter ready for use. Consequently, we repeatedly reemphasize the need for extreme care on the part of plotter operators. We have also had considerable mechanical difficulty with our plotter, and it will be returned to the manufacturer for a complete overhaul in the near future. A substitute plotter will be available while ours is gone.

Complaint: In connection with the new rate structure, specifically cover charge and setup charge; these rates have drastically increased charges for simple jobs. For example, placing a source deck onto PL/RTS using DATA SET is essentially peripheral but costs \$2.00 for 400 cards.

Reply: The new rates do indeed increase the cost of running simple jobs. They are the result of extensive study, however, and were recommended by the Computer Policy Committee of the Graduate College. It is felt that the setup and cover charges do, for the first time, spread equitably the charges our users must pay for computer services.

## Research and Development

### ATS

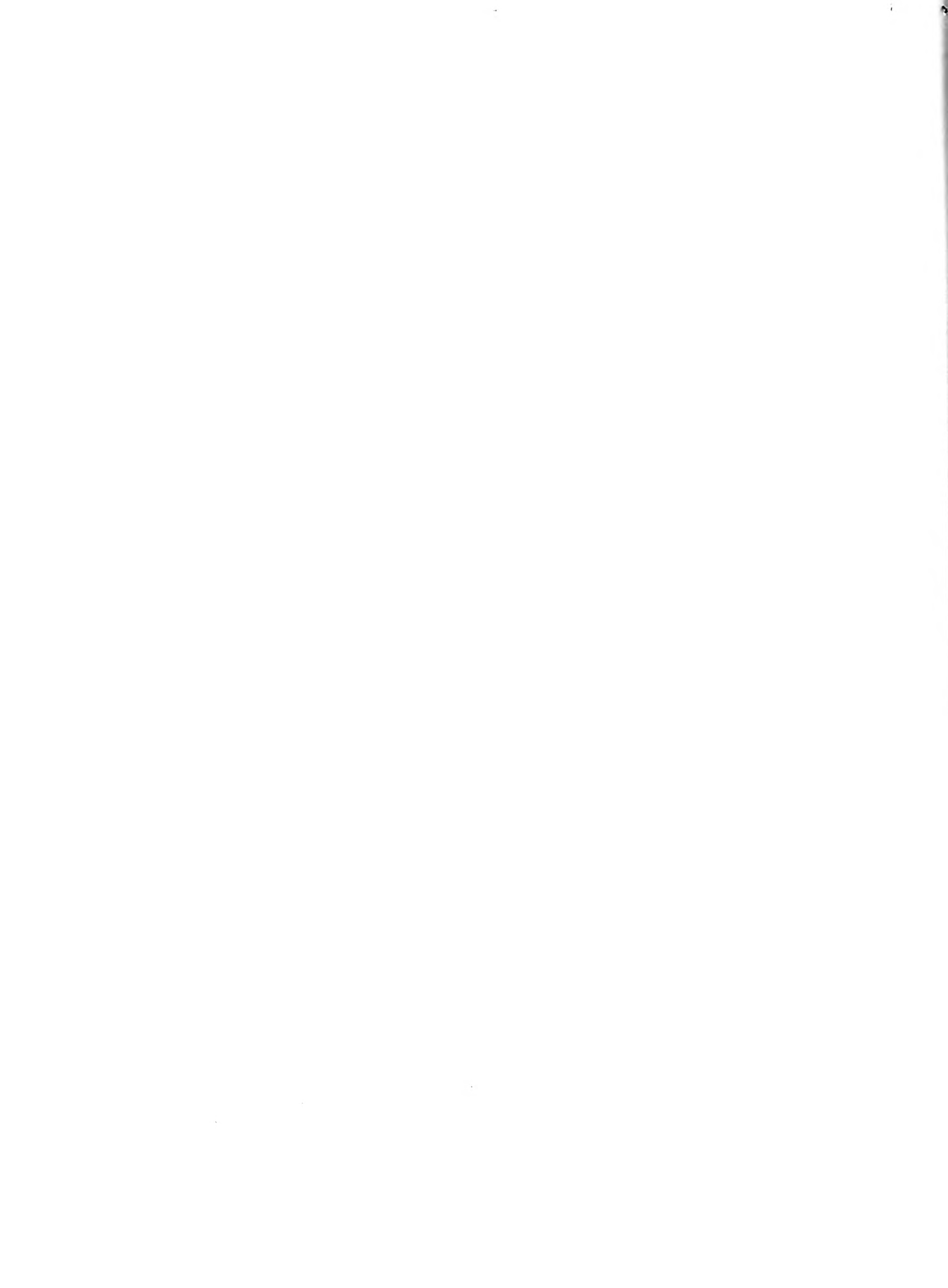
The Administrative Terminal System (ATS) is an on-line terminal system that may be used for the typing, editing, and layout of text for scientific or office documents. Through the use of typewriter terminals (IBM 2741 Communication Terminals), direct access storage on the System/360 is used to process and store text and data files.

The system can produce output from rough draft input with such features as page headings, page footings, page numbering, and right-margin justification. Input may be via typewriter keyboard, card reader, or magnetic tape, while output may be printed, put on magnetic tape, or punched. Printed output may be central or remote, high or low speed, uppercase or upper- and lower case.

During the initial typing operation erroneous data may be cancelled by use of the backspace key. Data files may be modified by deleting or inserting words, phrases, sentences, or paragraphs. Standard paragraphs may be retrieved from storage and inserted in form letters or periodical reports.

Stored information may be restricted to the operator who stored it, or made accessible to other operators. The separate terminals are able to communicate among themselves, and data entered on one terminal may be accessed and revised on another. ATS may be used to advantage in the production of such varied documents as: systems and procedure manuals, directories, library abstracts, program documentation, legislative drafts.

The Service Area has recently received several ATS terminals and is currently implementing the necessary software. It is expected that this system will be operative in the near future.



LIST and REPROD Procedure

Anyone using the catalogued procedure LIST must now include the following card:

```
//SYSUT2 DD SYSOUT=A
```

Anyone using the catalogued procedure REPROD must include the following card:

```
//SYSUT2 DD SYSOUT=B
```

Subroutine SMINZ

Subroutine SMINZ was deleted from the library on May 15, 1970. Users are advised to use BRONZ or FLPONZ.

**Miscellaneous**System/360 Runs

|          | January<br>1970 | January<br>1969 | %<br>Increase |
|----------|-----------------|-----------------|---------------|
| Class    | 19417           | 11973           | 62%           |
| Research | 11898           | 7771            | 53%           |
| Total    | 31315           | 19744           | 59%           |

|          | February<br>1970 | February<br>1969 | %<br>Increase |
|----------|------------------|------------------|---------------|
| Class    | 14954            | 17793            | -16%          |
| Research | 11738            | 9596             | 22%           |
| Total    | 26692            | 27389            | -3%           |

|          | March<br>1970 | March<br>1969 | %<br>Increase |
|----------|---------------|---------------|---------------|
| Class    | 27907         | 25830         | 8%            |
| Research | 12843         | 10053         | 28%           |
| Total    | 40750         | 35883         | 14%           |

|          | April<br>1970 | April<br>1969 | %<br>Increase |
|----------|---------------|---------------|---------------|
| Class    | 29963         | 23181         | 29%           |
| Research | 12831         | 8602          | 49%           |
| Total    | 42794         | 31783         | 35%           |

Selected Acquisitions

The Department of Computer Science Library (260 DCL) currently houses over 18,000 volumes and receives approximately 50 new books a month. Some of the most recent additions to the library are listed below.

System Simulation, G. Gordan

Assemblers and Loaders, D.W. Barron

Modern Nonlinear Equations, T.L. Saaty

Sequences and Combinatorial Problems, Gelfand, et.al.

Careers and Opportunities in Computer Science, J.M. Carroll

Pertinent Concepts in Computer Graphics, M. Faïman and J. Nievergelt

Color TV - Reception and Decoding Technique, B.W. Osborne

Computer Applications in the Earth Sciences, D.F. Merriam

The Computer and Business Unity, Hitchcock and Wille

Telecommunications and the Computer, J. Martin

Management Planning for Data Processing, D.H. Brandon

Problem Specification Forms

Users who send Problem Specification Forms by Campus Mail are requested to address these forms to:

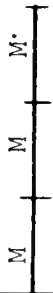

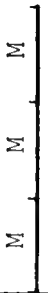
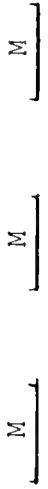
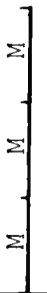

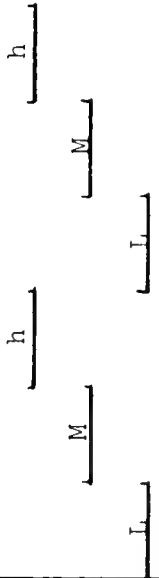

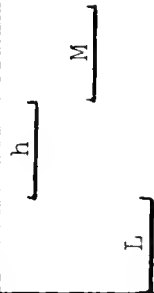



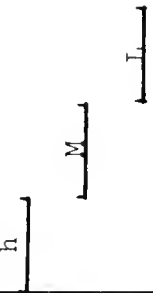

Information Desk  
Department of Computer Science  
Campus Mail

Forms addressed simply to "Department of Computer Science" or to any individual by name will probably be delayed in processing.





2 TONE GENERATOR ORIGIN - response to job number

|                               |   |   |
|-------------------------------|---|---|
| 1. Not loaded                 |    |     |
| 2. In system                  |    |     |
| 3. Out of system              |    |     |
| 4. T.S. off                   |    |    |
| 5. Busy (# wait)              |   |   |
| 6. Bad job #<br>(You goofed.) |  |  |
| 7. ASP not up                 |  |  |

Notes:

Do not input while a tone is being received.

30 seconds are allowed for entry of a job number.

M medium tone (1785HZ)

L low tone (1017HZ)

h high tone (2025HZ)

Tone Interval 1/2 sec.

followed by an immediate disconnect





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Please (include, delete) my name for the ILLINET OUTPUT Mailing List.

Name-title: \_\_\_\_\_

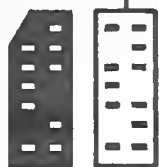
New Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

For change of address please indicate old address, unless it is printed below:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



Dean R. B. Downs  
222 Library



# *Jellinet Output*

University of Illinois at Urbana-Champaign-----Department of Computer Science

Vol. 2, No. 6

June, 1970

## Notice Board

### ASP to HASP

Many people, including Department of Computer Science staff members, users, and IBM personnel, have recently pointed to the success of installations which run the HASP system. IBM has, in fact, strongly recommended the replacement of ASP by HASP on the Department of Computer Science System/360-75.

Accordingly, the Service Area ran a benchmark consisting of 125 jobs under ASP and again under HASP. When comparison was made between the results of these test runs, it became evident that HASP outweighed ASP in overall performance. Those jobs processed under HASP took approximately 30 per cent less clock time to run when compared to the same job stream processed under ASP. This time differential was a result of increased efficiency of system overhead; HASP does not affect the CPU time used for individual jobs.

Reports from other universities who run under HASP confirm our comparison figures. Therefore, a decision has been made to convert from ASP to HASP on the Department of Computer Science IBM 360-75. HASP will replace ASP during the first week of July, 1970.

Concurrent with this change, a small-job monitor will be implemented, which should further improve throughput for a large number of Service Area users.

The conversion to HASP will not

be without some inconveniences to the user. Changes will need to be made in some ID cards and some JCL cards. A few of the "fancier" features provided in ASP by `/*FORMAT` cards will not be available. However, these changes will be outweighed by the resultant improvement in throughput for the system. Once the details of these changes have been exactly determined, notice will be given to the users.

### Faculty Short Courses

During the Summer Sessions, the Service Area will offer an expanded series of non-credit, no-fee short courses to aid present and prospective users of the IBM System/360. These courses are open to all faculty and staff members, and graduate students. Practical exercises and applications using the 360 computer will be emphasized in most course offerings. All courses will meet for 3 sessions per week: two 2-hour lecture/discussion periods and an optional 2-hour workshop period during which programming problems will be presented and individual help in solving these problems can be obtained. Those interested should complete an application form at the DCL Information Desk (from 8:00 a.m. to 5:00 p.m., Monday through Friday) not later than 5 days prior to the first meeting of the course for which application is

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EDITOR . . . . . Nick Smith

## System Briefing

Published ten times yearly by the Department of Computer Science, University of Illinois at Urbana-Champaign, Urbana, Illinois 61801.

being made. Each course will be limited to 35 students and may be cancelled if less than 10 applications are received.

A complete description of course offerings and dates scheduled is available at the DCL Information Desk. In general, courses are one or two weeks in duration and are presented in recommended series to provide a more complete understanding of a particular subject area. A schematic diagram of the courses offered appears on page 6. Questions concerning Faculty Short Courses should be directed to Robert Skinner, 195 DCL, 333-6145.

Courses to be Offered Are:

- Course 1.A Introduction to Computers and Programming Concepts - one week. Starts June 22, and July 14.
- Course 1.B Elementary FORTRAN IV - two weeks. Starts June 29, and July 21.
- Course 2.A Intermediate FORTRAN IV - two weeks. Starts June 29, and July 13.
- Course 2.B Advanced FORTRAN IV - two weeks. Starts July 27.
- Course 3.A HASP and O/S Concepts - one week. Starts July 13.
- Course 3.B JCL - two weeks. Starts July 20.
- Course 4.A Introduction to Assembly Language - one week. Starts July 14.
- Course 4.B Assembly Language Programming - two weeks. Starts July 21.
- Course 5.A Utilities - two weeks. Starts June 29.
- Course 5.B CalComp Plotting - one week. Starts July 27.
- Course 5.C PL/1 - one week. Starts July 13.

A system briefing will be conducted during the week of June 22, 1970 to help facilitate understanding and use of DCS facilities after the changes which are currently being implemented are completed. To be included in this briefing are changes to programming and operating procedures due to:

- . Conversion from O/S release 17 to 18.6
- . Addition of hardware
- . Conversion from ASP to HASP
- . Small-job monitor operation

Some of the areas to be discussed will be:

- . Region allocation
- . ID card changes
- . Use of SETUP facilities
- . Procedures and restrictions for use of small-job monitor
- . Availability of system resources
- . Scheduling and charges
- . Use of PL/1 and CALC/MP
- . Print and Punch data sets
- . PL/1 Version 5 compiler
- . HASP facilities
- . Dedicated data set use
- . 2780 operating procedures

All interested users are urged to attend this briefing which is scheduled to be conducted three times, from 9:00 a.m. to 12:00 noon Tuesday, June 23, Thursday, June 25 and Saturday, June 27 in DCL Conference Rooms 237 and 239. System programmers and Consultants will be present for a question and answer period.

Due to the magnitude of changes involved, tentative plans are being made to conduct system briefings on a continuing basis after the initial series described above. It is expected that these will be held every two weeks on Thursdays from 2:00 p.m. to 4:00 p.m. in the DCL Conference Rooms. These will be formally announced by a 360 Notice at a later date. Direct questions and comments concerning System Briefings to Robert Skinner, 195 DCL, 333-6145.





## Summer Illinet Output

Illinet Output is not published during July and August. The next issue will appear, therefore, in September.

## **Inquiry Station**

NOTE: Entries for the INQUIRY STATION originate with the "User Comment and Suggestion Form," which is available at the Information Desk and in the Consulting Office.

Question: Why do the system programmers frequently have to have the machine to themselves?

Reply: Systems programming consists of two broad categories: the day-to-day maintenance of the system, and long-range maintenance of the system plus development of new systems. The former can generally be accomplished within the system, i.e., under regular batch running. (Until recently, the programmers ran under the batch system within a category that gave them faster turn-around. At their own request, this category was dropped three months ago because of the user backlog.)

Periodically, IBM issues Releases to their operating system. These Releases contain accumulated error corrections which must be incorporated into the system when they are received. Generally, they cannot be incorporated into the system without using the entire machine for code-checking.

Question: Why can't you keep the Routing Room reader on the line?

Reply: When jobs are read into the system, they are copied ("spooled") onto a disk preparatory to being executed on MAIN. When this spool disk contains approximately 500 jobs or more and/or has less than 50% of its space left for additional jobs, the efficiency of the software system

becomes seriously degraded. When this situation occurs, the only solution is to read fewer jobs into the system. The practice has been to close down the Routing Room reader first. If this doesn't result in an increase in disk space and a decrease in the number of jobs on the disk, the next step is to turn off ~~PL~~ORTS and the 2780 terminals on campus. We dislike taking these steps, but there appears to be no other equitable way in which to solve the problem.

Complaint: Turn-around time is not good at the present time. When will it improve?

Reply: An increase in the job load during the past three months coupled with the imposed shutdowns due to the curfews, the loss of the use of the drum for a week and a half in March, and various hardware and software malfunctions have all contributed to the poor turn-around time.

Hopefully, the situation will be improved by the following steps. Soon we will be introducing a new batch monitor. It will allow those users with Assembler Language and FORTRAN G programs (certain restrictions to the programs will be announced later) to receive faster turn-around time. The monitor will also process WATFOR jobs in a similar manner. In addition to this new software, we are reconfiguring some of the peripheral hardware in an attempt to improve turn-around time.

## **Research and Development**

### Peripheral Input/Output

For input/output of data with peripheral devices (tape or disk), users should be aware of efficient blocking factors. Savings in both space and cost can be realized by basic knowledge of the device being used.

The physical record length or block length to be used is specified



by coding DCB=(BLKSIZE=n) on the JCL statement defining the device being used, where "n" is the block length in bytes. The following factors should be considered in determining the block length:

- (1) Cost - one I/O request is the equivalent of the transfer of one block of data.
- (2) Space - the larger the block length, the less space wasted on the tape or disk by block gaps.
- (3) Core - an area in core must be available which is equal to twice the block length in bytes.

A complete description of the proper procedures for determining block length may be found in the latest version of the Charges and Optimization handout (1-03) which is available in the Consulting Office.

#### Planning Guide For HASP-OS/MVT Release 18.6

As previously announced, conversion from ASP to HASP and implementation of OS/MVT Release 18.6 will take place the first week in July. A handout, Planning for HASP-OS/MVT Release 18.6, explaining the necessary modifications to user job decks is now available in the Consulting Office, 169 DCL.

#### Debugging CalComp on WATFOR

CalComp programs may now be debugged by using the WATFOR compiler along with the WATFOR Library program called CCPTST. No plotting is done. The following routines have been implemented:

CCP1PL, PLØT  
CCP2SY, CCP2SB, SYMBØL  
CCP3NR, NUMBER  
CCP4SC, SCALE  
CCP5AX, AXIS  
CCP6LN, LINE

Usage:

```
/*ID<ID card information>
// EXEC WATFOR
//WATLIB DD DSN=SYS4.CCPWAT,DISP=SHR
//SYSIN DD *
$JØB
```

CALL CCPTST(PL)

where PL is the length of the plot in inches (REAL\*4). This CALL must precede the first CALL to a CalComp routine in the program.

\$ENTRY

<data cards, if any>

\$STØP

/\*

Restrictions:

Only character strings and REAL\*4 arrays containing character strings may be passed to CCP2SB, SYMBØL, CCP5AX, and AXIS for the label or message to be plotted (the EBCDIC parameter). Use CCP2SY when it is desired to plot one of the special characters, and N is specified negative. For example:

```
CALL CCP2SB(1.0,1.0,.5,'STRING',0.0,6)
CALL SYMBØL(1.0,1.0,.5,ARRAY,0.0,12)
CALL CCP2SY(1.0,1.0,.5,14,0.0,-2)
CALL CCP5AX(1.0,1.0,'LABEL',5,10,0.0,T)
CALL AXIS(1.0,1.0,ARRAY,14,10.0,0.0,
          10.0,1.0,10.0)
```

After the program has been debugged using WATFOR, the program will be ready for FORTRAN G by changing the control cards and removing the 'CALL CCPTST' card.

#### Additions to PLØRTS

Users of PLØRTS terminals may now determine the status of a job in the 360/75 system without incurring any charges. The JOB command can now be given without logging in first. Any user who wishes to determine the status of his job in the system may do so, even though he has no problem specification number officially recognized by the PLØRTS system. Additional commands recently made available within PLØRTS are:



TRACK - prints the number of blocks allocated to a problem specification number and the number of blocks currently being used.

MSG - prints any operator messages.

#TAPEOUTM - produces paper tapes suitably formatted for manual readers.

COPYE - same as COPY command but allows for copying of files with more than one index level. This can be used for copying files from other PS#'s; e.g.:  
COPYE PS#.name.file

#LONGLINE - after typing, all list commands will print all characters in the line number specified on one printing line. This can be used with #COPY or #COPYC for changing lines longer than 72 characters.

#D L - deletes the LONGLINE function, thus enabling the normal list commands.

## Miscellaneous

|          | <u>System/360 Runs</u> |             |          |
|----------|------------------------|-------------|----------|
|          | May<br>1970            | May<br>1969 | Increase |
| Class    | 28924                  | 19485       | 48%      |
| Research | 8491                   | 8084        | 5%       |
| Total    | 37415                  | 27569       | 35%      |

### Summer Lockers Available

There are a few lockers in the DCL building available for use during the summer session. The assignments will be effective through September 14, 1970. Users interested in having a locker available for research problems may apply in Room 185, DCL.

## Selected Acquisitions

Some of the most recent additions to the Department of Computer Science Library (260 DCL) are listed below.

Pattern Recognition, N. Bongard

NonLinear Programming: A Unified Approach, W. I. Zangwill

Convex Analysis, R. T. Rockafellar

The Single Server Queue, J. W. Cohen

Understanding and Troubleshooting Solid-State Electronic Equipment, J. Berens and S. Berens

Operational Research, Makower and Williamson

Radio and Television: Principles and Applications, J. P. Hawker

Applied Linear Programming, N. Driebeek

Automatic Interpretation and Classification of Images, A. Grasselli

Abstract Methods in Partial Differential Equations, R. W. Carroll

Management Planning for Data Processing, D. H. Brandon

Automation and Behavior: A Social Psychological Study, J. Chadwick-Jones

Modern Control Engineering, K. Ogata

Elementary Numerical Analysis, Tompkins and Wilson

The Cerebellum As A Neuronal Machine, Eccles, Ito, and Szentagothal

Executive Decisions and Operations Research, Miller and Starr

The Visible Word - Problems of Legibility, H. Spencer



| COURSE<br>WEEK<br>OF: | INTRO<br>COMP<br>PROG<br>1.A               | ELEM<br>FORT<br>1.B        | INTER<br>FORT<br>2.A       | ADV<br>FORT<br>2.B | HASP<br>O/S<br>3.A                      | JCL<br>3.B         | INTRO<br>ASM<br>4.A                        | ASM<br>4.B           | UTILITIES<br>5.A  | CALCOMP<br>5.B                       | PLØRTS<br>5.C                          |
|-----------------------|--|----------------------------|----------------------------|--------------------|---|--------------------|--|----------------------|-------------------|--------------------------------------|--|
| June 22               | MWF<br>2-4 P.M.<br>237 DCL<br>SMITH        |                            |                            |                    |   |                    |  |                      |                   |                                      |  |
| June 29               |  | MWF<br>2-4 P.M.<br>237 DCL | MWF<br>1-3 P.M.<br>239 DCL |                    |   |                    |  |                      | MWF<br>10-12 A.M. |                                      |  |
| July 6                |  | 237 DCL<br>SMITH           | 239 DCL<br>WETZEL          |                    |   |                    |  |                      | 237 DCL<br>ZIMA   |                                      |  |
| July 13               | T Th S<br>10-12 A.M.<br>237 DCL<br>SKINNER |                            | MWF<br>2-4 P.M.            |                    | MWF<br>10-12 A.M.<br>237 DCL<br>SKINNER |                    | T Th S<br>10-12 A.M.<br>239 DCL<br>TANGMAN |                      |                   |                                      | MWF<br>2-4 P.M.<br>239 DCL<br>LEIGHTON |
| July 20               |  | T Th S<br>10-12 A.M.       | 237 DCL<br>SUBJECT         |                    |   | MWF<br>10-12 A.M.  |  | T Th S<br>10-12 A.M. |                   |                                      |  |
| July 27               |  | 237 DCL<br>SKINNER         |                            | MWF<br>2-4 P.M.    |   | 237 DCL<br>SKINNER |  | 239 DCL<br>TANGMAN   |                   | MWF<br>10-12 A.M.<br>239 DCL<br>ZIMA |  |
| Aug. 3                |  |                            |                            | 237 DCL<br>EITZEN  |   |                    |  |                      |                   |                                      |  |







MAILING LIST

The ILLINET OUTPUT is automatically sent to all persons on the following Mailing Lists:

The University Mailing List which includes all administrative personnel from  
Department Heads to the President.

The ILLINET OUTPUT mailing list.

For additions or deletions to the ILLINET OUTPUT Mailing List, please return this  
complete page to Editor, ILLINET OUTPUT, 127 DCL.

Please (include, delete) my name for the ILLINET OUTPUT Mailing List.

Name-title: \_\_\_\_\_

New Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

For change of address please indicate old address, unless it is printed below:

\_\_\_\_\_

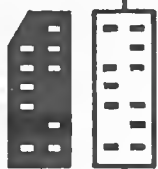
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Dean R. B. Downs  
222 Library



# *Illinet Output*

University of Illinois at Urbana-Champaign.....Department of Computer Science

Vol. 2 No.7

September, 1970

## Notice Board

### Summer System Changes

During the summer months substantial changes were made to the System/360. Among the more notable changes were:

1. Additional hardware was incorporated:
  - 1/4 million bytes fast core
  - 1 drum (second)
  - 1 5-drive 2314 disk
  - 1 2501 card reader (second).
2. Conversion was made from ASP to HASP.
3. O/S was upgraded from release 17 to release 18.6.
4. The Express Monitor was implemented, providing instant turn-around for small jobs.
5. PLAGO (a fast load-and-go PL/I compiler) was added to the system.

6. The Administrative Terminal System was made available.

7. A physical relocation of the Consulting Office, the 360/20 facility, and the Accounting Office was made. (See floor diagram in this issue of Illinet Output).

Most of these changes were made during July, with little inconvenience to system users. Turn-around time improved and there was an 81 per cent increase in the number of class jobs submitted as compared with July of 1969. The total number of user jobs increased 31 per cent over last July, and the total number of jobs submitted exceeded 45,000. This was a 37 per cent increase over July 1969, and the second highest month in the 2 1/2 year history of the System/360. We feel that the new system is capable of much more, however, and that the fall work load will reflect a substantially increased system usage.

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EDITOR.....Nick Smith

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61801.

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### Charge for Time Sharing Services

On May 1, 1970, a new rate structure went into effect which was based on the principle that each service offered should pay for itself. At the time this rate structure was formulated, it was intended that the same principle should apply to time sharing services. The PLORTS system, originally offered as an experimental system, has grown in usage to the point that it is a regular, much-used part of the system. A document processing system, ATS, is also now available.

The rates necessary to self-supporting time sharing services were approved by the Graduate College and went into effect August 1, 1970. They are:

Connect time: \$1.00 per clock  
hour  
Disk space: 0.20 per track  
per month

(The rate for disk space for time sharing files is the same as the rate for user disk space in the batch system.)

### Refund Policy

Refunds of time may be obtained for computer time lost due to machine or system error. All applications for refunds must be handled

through the Consultants and will be considered only under the following conditions:

1. All applications must be accompanied by all original, unaltered materials pertaining to the run; for example, the input card deck, the output listing, etc.
2. Application must be made within one week after the job was run.
3. It must be clearly shown that the run failed due to errors in the operating system, to malfunctions of the computer hardware, or to errors on the part of the operating or consulting staff.

### Touch-Tone Job Inquiry

Due to the costs involved, the university usually restricts the installation of 12-button touch-tone phones. This restriction will be waived, however for users of the System/360 who wish to use the touch-tone inquiry facility. The Department of Computer Science will assist its users in obtaining this waiver, by use of the following procedures:

An authorized signatory recognized by the Department of Computer Science may request the installation of a 12-button touch-tone phone by sending the following information in duplicate to Mr. Merlin J. Foster, 175 DCL:

A. Department.



- B. Name of person requesting touch-tone phone.
- C. Phone number to be changed (this must be a simple phone, i.e., no local or call-director).
- D. Location of phone to be changed.
- E. An active Problem Specification number.

The Department will verify that the Problem Specification number submitted is active, and return one copy of the request to the user. The second copy will be forwarded to the University Business Office, which will in turn notify the department making the request.

### PS 1000

PS Number 1000 can be used free of charge for "short, one-shot" runs. The purpose of this number is to allow members of the university community to experiment, on a short term basis, with the various compilers, etc., contained within the IBM 360 system.

Because PS 1000 is a free number, and because its use is for experimental purposes and not for production work, Department policy has been to restrict its usage. Thus, there is an upper limit of \$2.00 per run, and PS 1000 jobs are run only once a night during the work week.

With the introduction of the Express Batch Monitor, usage of PS 1000 increased considerably. It is felt that usage of PS 1000 in Express is not in harmony with the

purpose of PS 1000, as stated above. Therefore, any job run under PS 1000 on the Express Monitor will be flushed.

Users may continue to run under PS 1000 for experimental purposes by submitting their jobs on the HASP reader in Room 129 DCL or at the Routing Room. These jobs will automatically go into Class Z (a form of HOLD). As in the past, these jobs will be run once during the night.

### PLAGO

A new WATFOR-like PL/I load-and-go compiler is now available. For details, please see the handout available in the Consulting Office.

### Inquiry Station

NOTE: Entries for the INQUIRY STATION originate with the "User Comment and Suggestion Form," which is available at the Information Desk and in the Consulting Office.

Request: I request that the charges for disk space for time-sharing files be based on tracks used rather than tracks allocated. It is grossly unfair to charge for space which is available to other users.

Reply: When a request is made for block allocation on the PLORTS disk files, this space is effectively reserved for your use. If our policy were to over-allocate the number of blocks available on the disk, then someone else could be using your space. However, we limit the total amount





allocated to the actual space available. In effect, we are reserving for your use the number of blocks you request, and therefore charge you for the amount requested, not the amount used.

Request: I would like to request that the version 4 PL/I compiler be kept available for a rather long period of time. The reason is that I have over 70 different programs that are used in a simulator that will not run in the version 5 mode.

Reply: No plans have been made to remove version 4 of the PL/I compiler. We would suggest that you make the necessary conversions of your programs to run under version 5 as soon as it is convenient, but we will give ample notice when we finally decide to remove version 4.

Complaint: The last two times in the Consultant Office I have been cut in front of by inconsiderate users who thought their time was quite important. How about some kind of a queueing system so that everyone is on a "first come, first served" basis, such as a number system.

Reply: One objection to the solution you propose would be the confusion arising in trying to keep track of the next number in line. Some users like to return to the same consultant for advice, even though this might require waiting a little longer. We plan to erect a partition-wall in the consulting area so that access to the consultants can only be made through a single door. This will hopefully alleviate the problem.

Suggestion: Since IBM's

version of PL/I is quite slow, couldn't we get a version of PL/I like PL/C written at Cornell University? This would give us speedy compile runs for debugging PL/I jobs.

Reply: We have just implemented a fast version of PL/I, called PLAGO, written by Polytechnic Institute of Brooklyn. PLAGO is currently available for general use and will be made available to EXPRESS users as soon as possible. Copies of the PLAGO manual may be obtained in the Consulting Office.

## Research and Development

### Ordering of Jobs Within HASP

In order to utilize most efficiently the IBM 360/75 CPU, jobs cannot be processed in the order in which they are read in. Presently, HASP contains six initiators, each one capable of initiating a job. An algorithm, required because of the inherent design of HASP, has been designed which assigns jobs to an initiator based on ID card estimates.

$$x = \frac{\text{TIME (in sec.)} + (\text{LINES} * 3 + \text{IØREQ} * 10)}{100}$$

### Tentative Class Limits

A:  $x < 240$   
 B:  $240 < x \leq 1100$   
 C:  $1100 < x \leq 3000$   
 D:  $3000 < x$   
 Z: PS 1000

These limits will vary from time to time in order to determine the optimum limits for efficient throughput.



During prime time there are three initiators dedicated to processing Class A jobs, two initiators dedicated to Class B jobs, and one initiator dedicated to Class C jobs. (These initiators can be varied during non-prime time so that they are dedicated to any variation of the prime time structure indicated above, e.g., more Class C jobs.) Class D and Z jobs are initiated for processing only through active intervention on the part of the operator. (It is as though they were placed into HOLD until the operator released them.)

This information can be of value to those users who may wish to bring their ID card estimates more in line with the actual time, lines and IO requests required by their jobs. It is possible that by doing so, a job will fall into a lower class, and therefore be processed faster.

These limits can be varied dynamically by the operator. However, when they are varied, they will be varied only in an upward direction. This will have the effect of bringing jobs from a slower class into a faster class.

From time to time these standard limits may be raised or lowered in an attempt to determine the optimum limits for efficient throughput. Signs will be posted in Rooms 129 DCL and 166 DCL and in the Lobby of DCL which will contain the existing limits as of 8:00 a.m. each day, Monday through Friday.

## Mathematical Subroutine Library

A newly formatted index is now available for the 360 Mathematical Library writeups. The index no longer uses the SHARE classification system, but groups the subroutines available into the following categories:

- Arithmetic Routines
- Minimization of Functions
- Polynomials
- Special Functions
- Numerical Integration
- Ordinary Differential Equations
- Partial Differential Equations
- Interpolation
- Curve Fitting
- Matrix Operations
- Eigenvalues and Eigenvectors
- Simultaneous Linear Equations
- Random Number Generators
- Plotting Routines
- Service Routines

There are currently eighty-four subroutines available. Each subroutine listing includes the date of the last program update (upper date) and the date of the last writeup update (lower date). A copy of the new index may be obtained in the usual manner. (See Mathematical Subroutine Library, Aramis handout 2-41,



in the Consulting Office.)

A new routine, ADIPZ, is now available. ADIPZ provides an optimal parameter calculation for the ADI method of solving the system of linear equations resulting from discretization of an elliptic boundary value problem.

The following routines have been deleted:

SMINZ--function  
minimization

FIHZ, FICZ--interrupt  
handling routine (use  
ERRSET)

On September 15, 1970 the following routines will be deleted from the library:

ITIMEZ - Timing routine

This routine is being deleted because it is not compatible with MVT. The user should use STIMEZ instead.

CFIT2Z - Chebyshev curve  
fit

This routine will be replaced by CFIT3Z. CFIT3Z is similar to CFIT2Z, but it uses a more efficient algorithm.

### TPOPX Problem

The problem with respect to inability of the 1800 system to recover from a TPOPX (360 tape not ready) condition is still being investigated. It is now thought that the error may be occurring as a result of simultaneous access to the tape by both the 1800 and 360 at the time it is made ready by the 360 operator. In order to test this theory, 1800 users should use the

following JCL for tapes in the AMOS job step:

```
//ddname DD UNIT=TAPE,
//      DISP=OLD,LABEL=(,BLP),
//      VOL=SER=volserno
```

Note especially the use of BLP; this parameter prevents the 360 from verifying the absence of a tape label, which it does when NL is specified.

If the problem still occurs with this JCL, please notify the consultants.

### Naming of Class Datasets

There is now a new naming convention for permanent class datasets on public 2314 disk packs (UIUSRx). It is:

USER.xxx.nnn.name  
where xxx is the user's  
department code  
nnn is the course  
number

e.g.:

USER.DCS.201.name  
USER.AGEC.121.name  
USER.CE.390.name

Instructors may submit in writing the ps# and space to be associated with the course number to the Chief Consultant each semester. This will eliminate the need to rename class datasets each semester.

### Changes to /\*ID Card

Temporarily the keyword PUCØPIES= on the /\*ID card is ignored. Multiple copies of punched output will temporarily be unavailable. A notice will be posted when this feature is activated.



## Core Available for User Jobs

The largest amount of core that is available for a user job is 400K. To allow more would cause a serious impact on the efficiency of the system. Therefore, any job requesting a region size of more than 400K may be cancelled by the operator.

### LISTDISK

The system procedure LISTDISK was deleted Sunday, August 16, 1970. This procedure will be replaced at a later date with a new program.

## **Miscellaneous**

### System/360 Runs

|          | June<br>1970 | June<br>1969 | Increase |
|----------|--------------|--------------|----------|
| Class    | 6150         | 5920         | 4%       |
| Research | 13129        | 12640        | 4%       |
| Total    | 19279        | 18560        | 4%       |
|          | July<br>1970 | July<br>1969 | Increase |
| Class    | 20197        | 11145        | 81%      |
| Research | 17066        | 17278        | -1%      |
| Total    | 37263        | 28423        | 31%      |
|          | Aug.<br>1970 | Aug.<br>1969 | Increase |
| Class    | 12031        | 4696         | 156%     |
| Research | 15815        | 15063        | 4%       |
| Total    | 27849        | 19759        | 40%      |

## Selected Acquisitions

Some of the most recent additions to the Department of Computer Science Library (260 DCL) are listed below.

Random Counts in Models and Structures, G. P. Patel

Fundamentals of Display System Design, S. Sherr

Microcircuits and Their Applications, W. Gore

Information, Mechanism and Meaning, D. M. MacKay

The Interaction of Science and Technology, W. D. Compton

Computers for Management, H. Sturt and R. Yearsley

Fault Diagnosis of Digital Systems, H. Y. Chang, E. G. Manning, and G. Metze

Introduction to Computers and Data Processing, D. D. Benice

Basic Principles of Data Processing, J. A. Saxon and W. W. Steyer

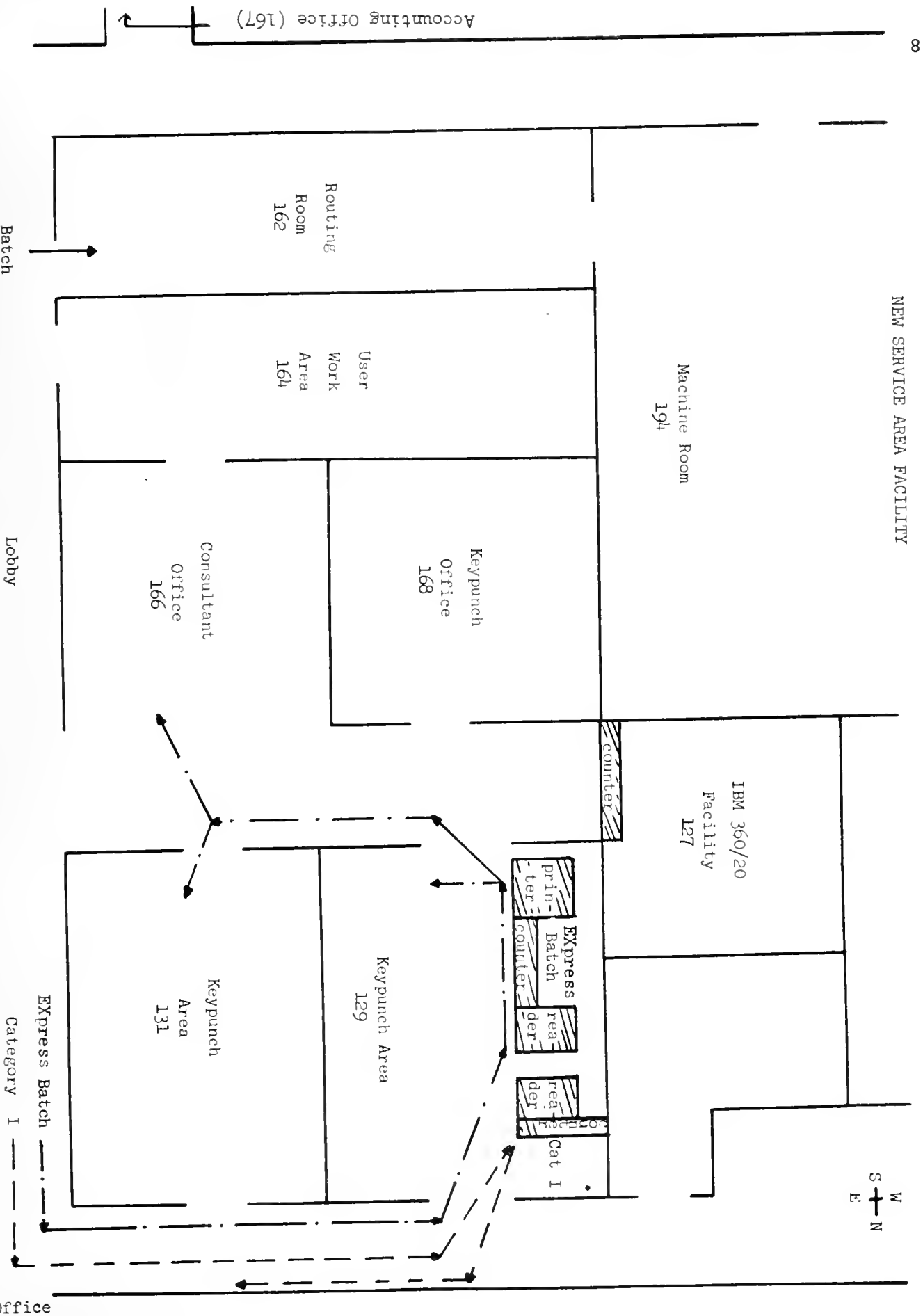
Computer Applications in Management, J. Birkle and R. B. Yearsley

Microprogramming: Principle and Practices, S. S. Husson





NEW SERVICE AREA FACILITY





# 360 Schedule of Operations

9

In the absence of serious hardware or software difficulties which require a deviation, the System/360 will observe the following schedule of operations:

|           | Mon.                             | Tues.                            | Wed.                             | Thurs.                           | Fri.                             | Sat.           | Sun.           |           |
|-----------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------|----------------|-----------|
| Midnight  |                                  |                                  |                                  |                                  |                                  |                |                | Midnight  |
|           | HASP<br>PLORTS                   | HASP<br>PLORTS                   | HASP<br>PLORTS                   | HASP<br>PLORTS                   | HASP<br>PLORTS<br>*              | HASP<br>PLORTS | HASP<br>PLORTS |           |
| 6:30 a.m. |                                  |                                  |                                  |                                  |                                  |                |                | 6:30 a.m. |
| 7:00 a.m. | Syst.<br>Prog.                   |                                  | Syst.<br>Prog.                   |                                  | Syst.<br>Prog.                   |                |                | 7:00 a.m. |
| 8:00 a.m. |                                  | Sched.<br>Engr.                  |                                  | Sched.<br>Engr.                  | *                                |                |                | 8:00 a.m. |
| 9:00 a.m. | HASP<br>PLORTS<br>ATS            | HASP<br>PLORTS<br>ATS            | HASP<br>PLORTS<br>ATS            | HASP<br>PLORTS<br>ATS            | HASP<br>PLORTS<br>ATS<br>*       |                | Syst.<br>Prog. | 9:00 a.m. |
| 1:00 p.m. | EXPRESS<br>HASP<br>PLORTS<br>ATS | EXPRESS<br>HASP<br>PLORTS<br>ATS | EXPRESS<br>HASP<br>PLORTS<br>ATS | EXPRESS<br>HASP<br>PLORTS<br>ATS | EXPRESS<br>HASP<br>PLORTS<br>ATS |                |                | 1:00 p.m. |
| 4:00 p.m. |                                  |                                  |                                  |                                  |                                  |                |                | 4:00 p.m. |
| 5:00 p.m. | EXPRESS<br>HASP<br>PLORTS        | EXPRESS<br>HASP<br>PLORTS        | EXPRESS<br>HASP<br>PLORTS        | EXPRESS<br>HASP<br>PLORTS        | EXPRESS<br>HASP<br>PLORTS        | HASP<br>PLORTS |                | 5:00 p.m. |
|           |                                  |                                  |                                  |                                  |                                  |                |                |           |
| 9:00 p.m. | HASP<br>PLORTS                   | HASP<br>PLORTS                   | HASP<br>PLORTS                   | HASP<br>PLORTS                   | HASP<br>PLORTS                   |                | HASP<br>PLORTS | 9:00 p.m. |
| Midnight  |                                  |                                  |                                  |                                  |                                  |                |                | Midnight  |

\* On the first Friday of each month, Friday is changed to:

|                   |                   |
|-------------------|-------------------|
| 12:00 - 6:00 a.m. | HASP, PLORTS      |
| 6:00 - 10:00 a.m. | Sched. Engr.      |
| 10:00 - 1:00 p.m. | HASP, PLORTS, ATS |

## MAILING LIST

The ILLINET OUTPUT is automatically sent to all persons on the following Mailing Lists:

The University Mailing List which includes all administrative personnel from  
Department Heads to the President.

The ILLINET OUTPUT mailing list.

For additions or deletions to the ILLINET OUTPUT Mailing List, please return this  
complete page to Editor, ILLINET OUTPUT, 173 A DCL.

Please (include, delete) my name for the ILLINET OUTPUT Mailing List.

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New Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

For change of address please indicate old address, unless it is printed below:

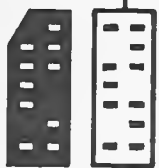
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# Illinet Output

University of Illinois at Urbana-Champaign-----Department of Computer Science

Vol. 2 No.8

October, 1970

## Notice Board

### Faculty Short Courses

During the Fall Semester, the Service Area will offer an expanded series of non-credit, no-fee short courses to aid the present users and prospective users of the IBM System/360. These courses are open to all faculty and staff members, and graduate students. Practical exercises and applications using the 360 computer will be emphasized in most course offerings. All courses will meet for 3 sessions per week: two 2-hour lecture/discussion periods and an optional 2-hour workshop period during which programming problems will be presented and individual help in solving these problems can be obtained. Those interested should complete an application form at the DCL Information Desk (from 8:00 a.m. to 5:00 p.m., Monday through Friday) not later than 5 days prior to the first meeting of the course for which application is being made. Each course will be limited to 35 students and may be cancelled if fewer than 10 applications are received.

A complete description of course offerings is available at the Information Desk, and

a schedule of the courses, times, dates, instructors, and places of meeting in chart form appears elsewhere in this issue of Illinet Output.

Courses to be offered are:

Course 1.A  
Introduction to Computers and Programming Concepts - one week. Starts October 26, and November 16.

Course 1.B  
Elementary FORTRAN IV - two weeks. Starts November 2, and November 30.

Course 2.A  
Intermediate FORTRAN IV - two weeks. Starts November 2, and November 16.

Course 2.B  
Advanced FORTRAN IV - two weeks. Starts December 7.

Course 3.A  
HASP and O/S Concepts - one week. Starts November 16.

Course 3.B  
JCL - two weeks. Starts November 30.

Course 4.A  
Introduction to Assembler Language - one week. Starts November 30.

Course 4.B  
Assembler Language Programming - two weeks. Starts December 7.

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EDITOR . . . . . Nick Smith

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Illinois at Urbana-Champaign,  
Urbana, Illinois 61801.

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Course 5.A

Utilities - two weeks. Starts  
November 2.

Course 5.B

CalComp Plotting - one week.  
Starts November 30.

Course 5.C

PLØRTS - one week. Starts  
November 16.

Course 5.D

Elementary PL/I - PLAGØ -  
two weeks. Starts December 7.

APL/360

APL/360 is a conversational terminal system that has been operational within IBM since the fall of 1966. APL/360 is based upon APL, the language first defined by K. E. Iverson in "A Programming Language" (John Wiley, 1962). It is an interpretive time-sharing system that built upon the array operations and structural integrity of APL.

The system features of APL have the following characteristics:

- (a) Simple, uniform rules of syntax.
- (b) Use of common symbols for the ordinary arithmetic operations.
- (c) Free-form decimal input.
- (d) A large set of primitive operators.
- (e) Use of defined functions (Programs) with the same facility and syntactic variety as primitive operators.

- (f) Automatic internal conversion of data representation; full double-precision arithmetic (16 decimal digits) when required.
- (g) Fast response (we hope).
- (h) A library structure built around "workspaces" that hold both data and programs.
- (i) An immediate-execution mode completely free of irrelevant keywords.
- (j) A comprehensive set of system commands for managing workspaces and libraries, and other essential functions.
- (k) Tracing and debug facilities.

APL is a widely accepted system which has drawn a large audience of users because of its analytical power and mathematical structure.

APL uses the IBM 2741 terminal, with a special type ball for the APL character set. Stickers are available which may be applied to the typewriter keys to show the APL characters. The same terminal, with a standard type ball, can also be used with the PLORTS and ATS systems. Guidance is available within DCS for users wishing to order terminals and telephone data sets.

Express Batch Monitor

The hours of operation for the Express Batch Monitor have been extended to 11:00 a.m. to 9:00 p.m., Monday through Friday, and 10:00 a.m. to 4:00 p.m. Saturdays. In addition, a new version of the UIEXPRESS monitor has been added to the system which contains the following additional features:





WATFOR

```

/*ID <ID card information>
// EXEC WATFOR
//SYSIN DD *
    <WATFOR source program>
/*
    No private WATLIB is
    permitted, 2 seconds maximum
    time, 5 pages maximum output.
    $NOLIST is honored within
    WATFOR source. Only one $JOB
    card honored per job.

```

PLAGO

```

/*ID <ID card information>
// EXEC PLAGO
//SYSIN DD *
    <PLAGO source program>
/*
    2 seconds maximum time,
    5 pages maximum output. Only
    one $BEGIN card honored per
    job.

```

## Inquiry Station

NOTE: Entries for the INQUIRY STATION originate with the "User Comment and Suggestion Form," which is available at the Information Desk and in the Consulting Office.

Complaint: I came in Saturday morning to pick up a service keypunch job, but the 360/20 room was locked. I thought it was supposed to be open 24 hours a day, seven days a week.

Reply: The keypunch area itself is open 24 hours a day, seven days a week, but the 360/20 room is only open from 7:30 a.m. Monday to 8:00 a.m. Saturday.

Complaint: The END= exit for a READ has not worked since

UIEXPRESS was initiated for FORTRAN G--when will it be corrected?

Reply: The problem has now been corrected.

Complaint: DATEZ gave bad results. It returned 0 October instead of 30 September.

Reply: The necessary corrections have been made to DATEZ and it is now working properly.

Complaint: The recorded answering service (333-0760) can never be trusted when it comes to the condition of timesharing. Often it reports that all systems are "go" when actually timesharing is down. This makes it necessary to call the routing room to find out the true condition of timesharing.

Reply: The reporting of all systems as "go" when timesharing is down is indeed a serious problem. The importance of accurately reporting the system status has been re-emphasized to the personnel involved. Calls to the routing room only interfere further with operations; therefore, every attempt is being made to make them unnecessary.

## Research and Development

UOI Subroutine Library

The UOI Subroutine Library is a collection of numerical analysis routines, plotting routines, and service routines. These routines have been incorporated into the 360



system in such a way that if a FORTRAN or ASSEMBLER program calls for a library routine, it will automatically be loaded from the system FORTRAN library. Thus, all a person needs to know is how to call a routine in order to use it.

This information is documented in the write-ups. There is a separate write-up for each library routine which includes pertinent information about the routine such as its purpose, usage, storage requirements, etc. In addition, there is an index which lists and describes the routines.

A copy of the index, and the source listing and write-up for each library routine are kept in the Consulting Office and in the DCL Library. An index is also posted on the 360 Notice Board. A user can obtain his own listing of the index or write-up by asking for a copy in the 360/20 room.

Users should keep informed of any changes to the UOI Subroutine Library by checking the 360 Notice Board for any notices regarding the subroutine library and also by consulting the latest index. The index is dated with the date of the most recent library revision. In addition, for each routine which appears in the index, the date of the latest program revision and the date of the latest write-up revision are included.

In rare instances, a user may want to change the coding of a library routine, or take the routine to another installation. When this is the case, the user may obtain a printed or punched copy of the source program in the 360/20 room.

## New Version of UØIFILE

A new version of UØIFILE, used for filing data sets into PLORTS, has been put on the system. This version corrects some known bugs, is more efficient, and gives more complete error messages than the previous version. The options PRINT=YES and PUNCH=YES are now available to print and/or punch a data set being filed. A handout describing the use of the new version of UØIFILE is available in the Consulting Office. Any problems concerning the new version should be brought to the attention of the Consultants, 166 DCL.

## UOI Subroutine Library Revisions

The following routines in the UOI Subroutine Library have recently been revised:

DGELGZ  
EIGENP  
EIGENZ  
EVIITZ  
SMEIGZ  
DET1Z, SØL1Z (combined to  
form CHØL1Z)  
DET2Z, SØL2Z (combined to  
form CHØL2Z)  
DET3Z, SØL3Z (combined to  
form CHØL3Z)  
BNDETZ, BNDSLZ (combined to  
form CHØL4Z).

The write-ups have been revised for the above routines as well as for the following:

BKTRNZ  
CEST1Z  
FRANCZ  
HØUSEZ  
LRCHZ  
PLØTZ  
PØL1Z  
PØL2Z

The following routines have recently been added to



the library:

RAMEZ--performs rational  
Chebyshev (minimax)  
approximation to a  
given function using  
REMES second algorithm.

DIAZ--performs double  
precision interval  
arithmetic.

PLØTEZ--makes plotting easy.  
MAT1Z, MAT5Z, MAT6Z, MAT7Z,  
MAT8Z, MAT10Z, MAT11Z, MAT12Z,  
MAT13Z, MAT14Z, MAT15Z,  
MAT16Z, generate  
special types of  
matrices for testing  
purposes.

The subroutine TSUBZ has  
been deleted from the library.

### Submitting 1800 Jobs

Due to the unusually long  
wait periods involved in  
running a program on the 1800  
AMØS system, the Department of  
Computer Science now provides  
a new service through which  
persons wanting paper tapes to  
read may have the 360  
operators run their 1800  
programs for them. Any  
program submitted for this  
service will be run by 8:00  
a.m. the following morning.  
The tapes must be distinctly  
marked or numbered so the  
operator can identify them.  
Also, the program deck should  
be given to a consultant for  
checking of control card  
errors before submitting. For  
more information concerning  
this new feature, please  
contact the Consulting Office.

### STIMEZ

Users should be aware of  
the fact that the routines  
STIMEZ does not give a very  
accurate timing estimate.  
Many separate timings of the  
same program may produce  
'almost random' results. In  
fact, the answers returned may

differ by as much as 10 per  
cent or more. This problem is  
due to MVT and the fact that  
the timer on the 360 only  
increments itself every 1/60  
of a second.

There are, however, some  
ways of getting a better  
estimate of time. One way is  
to obtain many separate timing  
estimates of a program and  
take an average.

Another way is to use  
test data which will cause the  
program to execute for several  
minutes, rather than several  
seconds. For instance, if a  
program which manipulates  
matrices is to be timed, use  
a 50 by 50 input matrix rather  
than a 4 by 4 matrix.

## Miscellaneous

### Selected Acquisitions

Some of the most recent  
additions to the Department of  
Computer Science Library (260  
DCL) are listed below.

An Algorithmic Approach to  
Nonlinear Analysis, E. J.  
Beltrami

Rational Thermodynamics,  
C. Truesdell

The Design of Computer  
Simulation Experiments, T. H.  
Naylor

The Computer Impact, I. Tauiss  
Managerial Operations

Research, W. D. Brinckloe  
The Executive Strategist,

R. C. Weisselberg and  
J. G. Cowley

Decision Table Software,  
H. McDaniel

Computer Data Processing,  
Davis

The Design of Design,  
G. L. Glegg

A Profile of Mathematical  
Logic, H. DeLong



Perspectives on the Computer Revolution, Z. W. Pylyshyn  
RPG I and RPG II Programming,  
R. W. Brightman, and J. R. Clark

### System/360 Runs

|          | Sept.<br>1970 | Sept.<br>1969 | Increase |
|----------|---------------|---------------|----------|
| Class    | 13209         | 1649          | 701%     |
| Research | 12877         | 8791          | 46%      |
| Total    | 26086         | 10440         | 149%     |

### UIEXPRESS Speeds Computer Jobs\*

Engineering and computer science students not looking forward to another semester of struggling with computer programs which take days and weeks longer than necessary because of long lines of students and long computer turnaround times were pleasantly surprised to discover that a change in programming this summer allowed installation of a special express service.

A separate Express Batch Monitor Routing room is available in 129 Digital Computer Lab for small computer jobs. Student users may now submit small jobs and immediately obtain results from the printer. Previously, the average turnaround time for all jobs was several hours. The new service will enable students to immediately correct typographical errors in punched cards and more rapidly get their work done. The new system should also make things significantly easier for teachers who have often had to omit work or revise course outlines because of computer-caused setbacks.

In addition to the special express service, the new program is expected to somewhat speed up turnaround time for larger jobs.

---

\*Ed. NOTE: Portions of this article first appeared in STUDENT AFFAIRS, University of Illinois, Vol. 8, No. 1.





| COURSE:<br>+<br>WEEK OF:<br>+ | INTRO<br>COMP<br>PROG                 | ELEM<br>FORT               | INTER<br>FORT    | ADV<br>FORT        | HASP<br>O/S                             | JCL                | INTRO<br>ASM                            | ASM                  | UTILITIES         | CALCOMP                              | PLØRTS                                   | PLAGØ             |
|-------------------------------|---------------------------------------|----------------------------|------------------|--------------------|---|--------------------|---|----------------------|-------------------|--------------------------------------|--|-------------------|
|                               | MWF<br>1-3 P.M.<br>115 DCL<br>SMITH   |                            |                  |                    |   |                    |   |                      |                   |                                      |  |                   |
| Oct. 26                       |                                       |                            |                  |                    |   |                    |   |                      |                   |                                      |  |                   |
| Nov. 2                        |                                       | MWF<br>1-3 P.M.<br>115 DCL | MWF<br>2-4 P.M.  |                    |   |                    |   |                      | MWF<br>10-12 A.M. |                                      |  |                   |
| Nov. 9                        |                                       |                            | SMITH            |                    |   |                    |   |                      | 237 DCL<br>ALLEN  |                                      |  |                   |
| Nov. 16                       | MWF<br>2-4 P.M.<br>239 DCL<br>SUBJECT |                            | MWF<br>1-3 P.M.  |                    | MWF<br>10-12 A.M.<br>237 DCL<br>JOHNSON |                    |   |                      |                   |                                      | MWF<br>10-12 A.M.<br>239 DCL<br>LEIGHTON |                   |
| Nov. 30                       |                                       | MWF<br>2-4 P.M.            | 115 DCL<br>CLACE |                    |   | MWF<br>10-12 A.M.  | MWF<br>1-3 P.M.<br>237 DCL<br>GREENBERG |                      |                   | MWF<br>10-12 A.M.<br>237 DCL<br>ZIMA |  |                   |
| Dec. 7                        |                                       | 239 DCL<br>SUBJECT         |                  | TTHS<br>10-12 A.M. |   | 237 DCL<br>JOHNSON |   | MWF<br>1-3 P.M.      |                   |                                      |  | MWF<br>10-12 A.M. |
| Dec. 14                       |                                       |                            |                  | 115 DCL<br>EITZEN  |   |                    |   | 115 DCL<br>GREENBERG |                   |                                      |  | 239 DCL<br>PENKA  |



U/I Subroutine Library Questionnaire

8

The 360 Service Area is engaged in an effort to improve the quality of its subroutine library. To help ensure the relevance of this effort, users are requested to fill out the questionnaire below and return it to the Information Desk, Mail Lobby of DCL.

- 1) In what field are you working? \_\_\_\_\_
- 2) Which University of Illinois library routines and/or SSP routines have you used?

| <u>Routine Name</u> | <u>How often used?</u> | <u>How did it perform?</u> |
|---------------------|------------------------|----------------------------|
|---------------------|------------------------|----------------------------|

|       |       |       |
|-------|-------|-------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |
| _____ | _____ | _____ |

- 3) What other type of routine would be of benefit to you if made available in the subroutine library?

|       |
|-------|
| _____ |
| _____ |
| _____ |
| _____ |
| _____ |

- 4) General Comments

|       |
|-------|
| _____ |
| _____ |
| _____ |
| _____ |
| _____ |

## MAILING LIST

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The University Mailing List which includes all administrative personnel from  
Department Heads to the President.

The ILLINET OUTPUT mailing list.

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Please (include, delete) my name for the ILLINET OUTPUT Mailing List.

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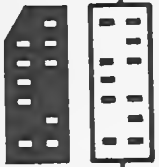
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# Illinet Output

University of Illinois at Urbana-Champaign-----Department of Computer Science

Vol. 2 No.9

November, 1970

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## Notice Board

### New Keypunch Facilities

The Service Area of the Department of Computer Science has established two additional keypunch facilities on campus as a convenience to users who normally work some distance from the main facility. Twenty new keypunches have been installed in Rooms 70 and 85 in the basement of Commerce West, and ten keypunches have been installed in the typing room in Oglesby Hall (in the Florida Avenue Residence Hall Complex, F.A.R.). A total of 37 keypunches are directly available to users at the main facility in D.C.L.

Cards will be provided at all three facilities, but keypunch operators will be on duty only at D.C.L. Both the Commerce West and the F.A.R. facilities are now operational. Initially, the facilities will have the following hours of operation:

#### Commerce West

Rooms 70 and 85, Commerce West  
7:30 a.m. to 11:00 p.m.  
Monday - Friday  
7:30 a.m. to noon Saturday

#### F.A.R.

Typing Room, Oglesby Hall  
8:00 a.m. to midnight  
7 days a week

#### D.C.L.

Rooms 129 - 131 D.C.L.  
24 hours a day - 7 days  
a week, except holidays

### Withdrawal of IBM 1800 from Service

In order to meet the analog conversion requirements of various departments at the University of Illinois, the Department of Computer Science has provided, as an auxiliary computer, an IBM 1800 for its users. It was hoped that usage on the 1800 would increase to the point that it would become financially self-supporting. This has not turned out to be the case.

The College of Engineering has been successful in acquiring a successor hybrid machine which will fulfill the analog conversion requirements of DCS users. This machine should be



EDITOR.....Nick Smith

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Urbana, Illinois 61801.

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available for use by about  
February 1, 1971. Therefore,  
it is hoped and planned that  
the IBM 1800 operated by DCS  
can be withdrawn from usage  
after January 31, 1971.  
Preliminary information about  
the hybrid computer can be  
obtained from Professor  
Timothy N. Trick, 4-119  
Coordinated Science  
Laboratory, Urbana, Illinois.

#### Availability of WATFIV

WATFIV, an extensive  
update to WATFØR, is now  
available on the system 360/75  
(HASP reader only). All IBM  
FORTRAN IV language  
specifications (IBM manual  
C28-6515) and several new  
extensions have been  
implemented. A handout of  
control cards is available in  
the Consulting Office. Notice  
will be given when a  
comprehensive writeup is  
available and when WATFIV is  
available on EXPRESS.

#### Inquiry Station

NOTE: Entries for the INQUIRY  
STATION originate with the  
"User Comment and Suggestion  
Form," which is available at  
the Information Desk and in  
the Consulting Office.

Suggestion: Open EXPRESS in  
the morning from 8:00 a.m. on.  
This would help the problem of  
long lines of students at  
night.

Reply: We have discussed  
extending EXPRESS hours back  
to the time in the morning  
when the entire system is  
brought up. EXPRESS is still  
in the process of development,  
however, and the morning hours  
are needed for code-checking  
of improvements. Until such  
time that the load on EXPRESS  
becomes too great and/or the  
improvements to EXPRESS are  
completed, we will have to  
continue to reserve the  
morning hours for in-house  
work.

Complaint: The telephone  
recording service said that  
jobs through 1210 were out so  
I came to pick up 1209. I was  
informed, however, that it was  
still in the system and that  
information on exceptions was  
not available. This latter  
point should be advertised and  
the recording service should  
end each section saying "with  
exceptions."

Reply: When HASP was  
introduced in July, the  
program that provided the job  
exception information was not  
converted due to various  
programming difficulties. The  
Touch-Tone Inquiry System now  
in use, though, provides a  
more efficient and accurate  
method of determining whether  
or not a job is out. In the  
future, however, the recording  
service will indicate that  
there may be exceptions.

Request: Put coat racks some  
place in the building.





Reply: Thank you for the suggestion. Coat racks will be installed in the near future on the wall near the entrance to the Consulting and Key punch areas.

Suggestion: Put a card reproducer and a printer in the keypunch room or some other place that is convenient for the student to help himself. The present system requires the service of the keypunching girls even when you only need a listing of a deck to check keypunch errors. Usually the girls are very busy and you have to wait for hours.

Reply: The original decision to rent the IBM 360/20 was economically possible only by returning our card lister and reproducer. The rental of this additional equipment would result in increased expenses to the users and at present does not appear to be warranted.

Turn-around time for listing a deck on the 360/20 should be relatively short during the day. This waiting time could be longer after midnight when long 360/20 jobs are processed, but generally it is short enough so that listings can be acquired in a reasonable length of time.

Suggestion: Put the HASP reader in a different place so users would enter a different door than EXPRESS users.

Reply: We are at present studying possible rearrangements of the room 129. Your suggestion has been forwarded to those studying the situation.

Suggestion: I have noticed when running short jobs on the HASP system with turnaround time at about a half an hour that it is hard to tell when my job is done and out in the routing room. If I check at the window repeatedly, it wastes the router's time. If I wait a long time, I could be wasting my own time. How about a blackboard in the routing room listing the highest job number in the bins.

Reply: Thank you for your suggestion, but a blackboard indicating the highest job number in the bins would not indicate those jobs which were exceptions. Also, users would rely on the blackboard and not the phone service to determine whether or not their jobs were out, thus increasing the confusion.

Generally, the jobs are in the output bins within 15-30 minutes after they have been printed. At present there appears to be no efficient way of indicating when jobs are in the bins without creating greater confusion, but we appreciate your suggestion.

## Research and Development

### LISTDISK

A new utility program, LISTDISK, has been added to the system. LISTDISK provides a formatted listing of the volume table of contents (VTOC) for direct access volumes, including listing of member names for partitioned data sets and printing of core



sizes or system status information for load modules. LISTDISK is an extension of the program called DISKMAP; it gives more information and will work on both disks and drums. Those people currently using DISKMAP should begin using the newer version, LISTDISK.

Explanations of how to use LISTDISK correctly are found only in the current ARAMIS Utilities handout in the Consulting Office, 166 DCL. Because of this system change, the original version, DISKMAP, is considered obsolete and will be deleted from the system in December.

#### UØI Subroutine Library Updates

The following routines have been deleted from the UØI Subroutine Library:

BNETZ  
BNDSLZ  
TSUBZ  
SNOOPER (Alias BRANCH,  
OFFTRA, ØNTRA, SCAN, TRACEØFF,  
TRACEØN)

A new routine, CHØL4Z, has been added to the library. CHØL4Z finds the solution to a set of simultaneous linear equations by the Cholesky method. The coefficient matrix must be real, symmetric, and positive definite. This routine is particularly designed for band matrices. However, CHØL4Z should only be used when the band is narrow. For wider bands, this routine becomes less efficient and the routine CHØL1Z should be used.

In order to economize space on FØRTUØI, it has been decided to delete the routine

RANDEV (Alias GETDEV, GETDVZ, NDEVZ, SETDEV, SETDVZ). The routine will be deleted after January 1, 1971, and any objections should be raised before then by contacting Beth Richardson, 333-1355.

#### Timing Problem

Users should be aware of a CPU timing problem with the System/360-75 using ØS/MVT. Due to a low accuracy interval timer (1/60 of a second) and the sharing of CPU time by several jobs, CPU times charged may vary as much as 5% for the same job. Time estimates on the /\*ID card should therefore always include an extra 5% leeway.

#### Write-Ups for PL/I CalComp Routines

The write-ups for the PL/I CalComp routines have been deleted from UIUSR4 and are now kept in the 360/20 room. Users can obtain their own printed or punched copies of the write-ups by asking for the following routines:

PLØT, SYMBØL, NUMBER,  
AXIS, LINE, STRINGZ,  
SCALE1Z, SCALE2Z, DASHZ,  
LØGAXIZ.

### Miscellaneous

#### FORTRAN Optimization Hints

The following is a list of hints on how to optimize your FORTRAN coding in order



to achieve better accuracy in calculations and to increase the speed of execution of your programs in general. Additional hints will appear in next month's issue.

1. Analyze the problem before programming. The information obtained can be used to simplify the problem and speed up the numerical procedure.

2. Use a minimum of mixed-mode arithmetic. The extra coding generated can in some cases take more time to execute than the arithmetic itself. Use  $X=0.0$  instead of  $X=0$ ,  $I=0$  instead of  $I=0.0$ . Choose variable types to avoid conversions whenever possible.

3. Avoid using SUBROUTINES and FUNCTIONS for small repeated tasks.

4. Arrange the problem logic to avoid branches whenever possible.

5. Make the most probable result of all logical IF statements a simple drop through instead of a branch.

6. Use implied DO loops in input-output in place of I/O within actual DO loops where possible.

7. Calculate all quantities which are constant through a program at the beginning, and calculate all quantities constant throughout a loop outside the loop.

For example:

DO 20 I=1,450

20 C(I+3,2\*I+1)=

X (D\*(I+2))\*\*(2\*K)+E-2\*L-1

should be written

M=2\*K

F=E-2\*L-1

DO 20 J=3,452

20 C(J+1,2\*J-3)=(D\*J)\*\*M+F

## Selected Acquisitions

Some of the most recent additions to the Department of Computer Science Library (260 DCL) are listed below:

Switching and Finite Automata Theory, Z. Kohavi

Introduction to Switching Circuit Theory, D. D. Givone

Optimization by Variational Methods, M. M. Denn

Digital Simulation of Continuous Systems, Y. Chu

An Introduction to Error-Correcting Codes, S. Lin

Critical Facts in Data Management, F. Gruenberger

System Structure in Data, Programs, and Computers, L. R. Johnson

Cost and Optimization Engineering, F. C. Jelen

User's Guide to Linear Programming, H. G. Daellenbach and E. J. Bell

Problem Solving by Digital Computer with PL/I Programming, A. Vazsonyi

Noise: Sources, Characterization Measurement, A. VanDer Ziel

## System/360 Runs

|          | Oct.<br>1970 | Oct.<br>1969 | Increase |
|----------|--------------|--------------|----------|
| Class    | 51720        | 25565        | 102%     |
| Research | 12120        | 12489        | -3%      |
| Total    | 63840        | 38054        | 68%      |

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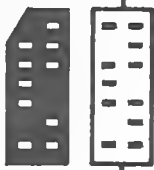
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# *Illinet Output*

University of Illinois at Urbana-Champaign-----Department of Computer Science

Vol. 2 No.10

December, 1970

## Notice Board

### Holiday Greetings

#### To Our Users:

As the Festive Season approaches, we wish to extend to you our warmest Holiday Greetings, and express our appreciation for the patronage you have accorded us. We hope to enjoy the privilege of serving you in the future. In the meantime, may you have the brightest holiday ever, and may the New Year bring you all manner of good things.

The Service Area of the Department of Computer Science.

### COSMIC Programs

Many of the non-classified programs written by the National Aeronautics and Space Administration (NASA), Atomic Energy Commission (AEC), and Department of Defense (DOD) are available for public use. Documentation and copies of the programs are available for a nominal charge through the Computer Software Management and Information Center (COSMIC).

Since many of the programs available are engineering application

routines, they may be of particular use to the engineering research personnel on campus.

Anyone interested in these programs may consult the catalog of abstracts available in the Consulting Office.

### Proposed CalComp Changes

A change in CCPIPL is under consideration which would eliminate resetting of FACTOR and/or OFFSET after a negative IC use. A reset of the origin may reflect a new graph; however, such is not normally the case, and leaving FACTOR and/or OFFSET alone might therefore be helpful.

Also, CalComp recently updated the SCALE and AXIS routines to eliminate the parameter DIV, and implementation of this update is being considered. Users of DIV=10.0 would not be affected, but use of any other values for this parameter would no longer be permitted.

Comments are appreciated and should be addressed to Michael Clancy, 114 DCL.

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EDITOR . . . . . Nick Smith

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Urbana, Illinois 61801.

### Filing into PLØRTS

In the past it has not been possible to run FILE jobs when the PDP-7 computer was down. This has been corrected by a new version of PLØRTS which now allows FILE jobs to be run even when the PDP-7 computer is not operating.

### EXPRESS and the Research User

In the near future the EXPRESS system will be available to all 2780 terminals on campus (there are six such terminals now: Chemistry, Civil Engineering, Commerce West, Materials Research Lab., Office of Instructional Resources, and State Water Survey). In the past, however, the EXPRESS system has been used almost exclusively by classes. There has been very little research use of the system.

Although many research users may not be able to use the EXPRESS system because of its restrictions, others could use it for code checking and possibly even production runs after minor program changes. Such shortcuts as compiling only, using object decks, and getting no source listings could allow many researchers to use the EXPRESS system and thereby get much better turnaround.

For additional information in programming shortcuts, users are referred to the handout "Charges and

Optimization Hints" (ARAMIS Section 1-03) available in the Consulting Office.

## Inquiry Station

NOTE: Entries for the INQUIRY STATION originate with the "User Comment and Suggestion Form," which is available at the Information Desk and in the Consulting Office.

Suggestion: I think it is a good idea to have keypunches at FAR and Commerce West, but now I have to wait at DCL to punch 2 or 3 cards while others are punching whole programs. I suggest a separate section of keypunches just for those who only have a few cards to punch, or else don't let users punch whole programs at DCL.

Reply: In the past we have had keypunches set up with a five or ten card limit. The amount of policing required to enforce these limits during peak periods, however, proved impractical. The two long-legged keypunches were then set up to serve users with just a few cards to punch and served this purpose well until the class load significantly increased. Several more keypunches will be equipped with long legs in the near future to help compensate for this increased class load.

To not allow users to punch large decks at DCL would force users on the north end of the campus to travel to FAR or Commerce West to punch their programs. We feel this would be a step backward in our service to the user.



Suggestion: Pipe music into the corridor leading to the EXPRESS room.

Reply: There are currently no funds available to implement your suggestion even if we could get users to agree on the type of music to play.

Suggestion: Put an EXPRESS system at Commerce West and eventually at MRH, FAR, and LAR.

Reply: Within the next few months EXPRESS will become available at Commerce West and all other 2780 terminals (Chemistry, Civil Engineering, Materials Research Lab., Office of Instructional Resources, and State Water Survey).

The EXPRESS system is presently used almost exclusively by classes. Since class work is free to the departments, additional terminals primarily for EXPRESS use would mean using research money to pay for facilities which the researchers do not use. Thus, there is little possibility of putting additional terminals at MRH, FAR, and LAR.

Request: Why don't we have Release 3 of SNOBOL 4 on our system? It has been available for over a year, and I believe that it is available free to all those who have Release 2. Release 3 has additional features that would be handy for the SNOBOL user.

Reply: We now have the necessary forms and are sending for Release 3. It will be examined and made available to our users as soon as it is feasible.

Suggestion: Make a bypass of execution possible on EXPRESS. For example, use the execute parameter of Assembler G instead of loading the program by the monitor.

Reply: The EXPRESS programming group has decided not to implement your suggestion in order to allow the following added features: access to the FORTRAN Library, LKED to object decks, indicative and snap dumps of user programs, and use of a preloaded FORTRAN I/O conversion routine. In that many of the "assemble and go" features of the EXECUTE mode are simulated by EXPRESS anyway, e.g., in-core SYSLIN and preloaded I/O packages, the additional features are included at only a small cost.

## Research and Development

### Random Number Generators

Some programmers have been using ITIMEZ to obtain a starting value for a random number generator. This is not a particularly good way to initialize a random number generator.

The routines RAN3Z and RANBZ in the UØI Subroutine Library require that the user initialize the computation with an odd integer. This can be any odd integer.

The best procedure to follow is to pick an odd integer, generate the set of random numbers and save the last integer random number. This last integer random number can then be used as a starting value for the next



set of random numbers generated.

In using the time of day for a starting value it is possible that, by chance, the computation may be started somewhere in the sequence of the last set of random numbers generated. The two sets of numbers would then partially overlap. The above method, however, ensures that everytime RAN3Z or RANBZ is used a completely different set of random numbers will be generated (that is, until the period of the generated numbers is exceeded, e.g., 2\*\*22 for RANBZ).

### "360" and "TIME" Parameters

Some users have been confused about the correct form of the "360" and "TIME" parameters on the ID card. Both parameters merely specify the total CPU time the job is to be given; the only difference is their form. The "TIME" parameter has the same form on the ID card as it has on EXEC cards. As a reminder, the correct forms are listed below:

$$360 = \begin{Bmatrix} \text{h.m.s} \\ \text{m.s} \\ \text{m.} \\ \text{s} \end{Bmatrix} \quad \text{TIME} = \begin{Bmatrix} (\text{m}, \text{s}) \\ (, \text{s}) \\ \text{m} \end{Bmatrix}$$

One minute is the default (360=1. or TIME=1).

Examples:

360=0.0.30 -- 30 seconds  
 360=5. -- 5 minutes  
 360=1..5 -- 1 hour, 5 seconds  
 360=125 -- 125 seconds  
 TIME=5 -- 5 minutes  
 TIME=(5,30) -- 5 minutes,  
                     30 seconds  
 TIME=(,30) -- 30 seconds

### More FORTRAN Optimization Hints

As promised last month, here are more hints for optimizing your FORTRAN coding.

1. Use as few subscripts as possible on arrays (e.g., use A(720) instead of A(12,6,10)).
2. Use unconditional GØ TØ's. instead of computed GØ TØ's.
3. Where possible pass variables to SUBROUTINES through CØMMØN instead of using parameter lists; this saves much time because addresses do not have to be passed down to the subroutines for the variables in the calling sequence.
4. Do not test for equal using floating-point variables, because of round-off error in low-order bit. Use .GE. or .LE.
5. Use SQRT instead of \*\*.5, since the SQRT routine is faster than the logarithm routine used to evaluate expressions of the form X\*\*R. X\*\*R is computed through EXP(R\*ln(x)).
6. For small powers, use A\*A\*A ... or A\*\*I with I=R instead of A\*\*R, where R is a floating point integer; values raised to integer powers are computed by repetitive multiplication, whereas values raised to real powers are computed by using logarithm and exponential routines. A\*\*R is about four times slower than A\*\*I.
7. Use unformatted I/O for scratch units. FØRMATS waste time and space.



8. Use logical IF's instead of arithmetic IF's.

9. Store any array element used more than once in a loop in a temporary scalar variable.

10. Use assigned GØ TØ's instead of computed GØ TØ's.

11. Use logical IF's instead of 2-way GØ TØ's.

## Miscellaneous

### Selected Acquisitions

Some of the most recent additions to the Department of Computer Science Library (260 DCL) are listed below.

Management by Information System, J. E. Ross

OS/360 Job Control Language, H. W. Cadow

Time Series Analysis Forecasting and Control, G. E. P. Box and G. M. Jenkins

Random Counts in Biomedical and Social Sciences, G. P. Patil

Design and Use of Computer Simulation Models, J. R. Emshoff and R. L. Sisson

Centralized Systems, A. M. McDonough

Organization for Manufacturing, I. R. Vernon (ed.)

Digital Electronics with Engineering Applications, T. P. Sifferlen and V. Vartanian

Production and Inventory Control Handbook, J. H. Greene

Automatic Data Processing, E. M. Awad

Computer Methods of Structural Analysis, F. W. Beaufait, W. H. Rowan, Jr., P. G. Hoadley, and R. M. Hackett

### System/360 Runs

|          | Nov.<br>1970 | Nov.<br>1969 | Increase |
|----------|--------------|--------------|----------|
| Class    | 52158        | 27043        | 93%      |
| Research | 10497        | 13191        | -20%     |
| Total    | 62655        | 40234        | 56%      |

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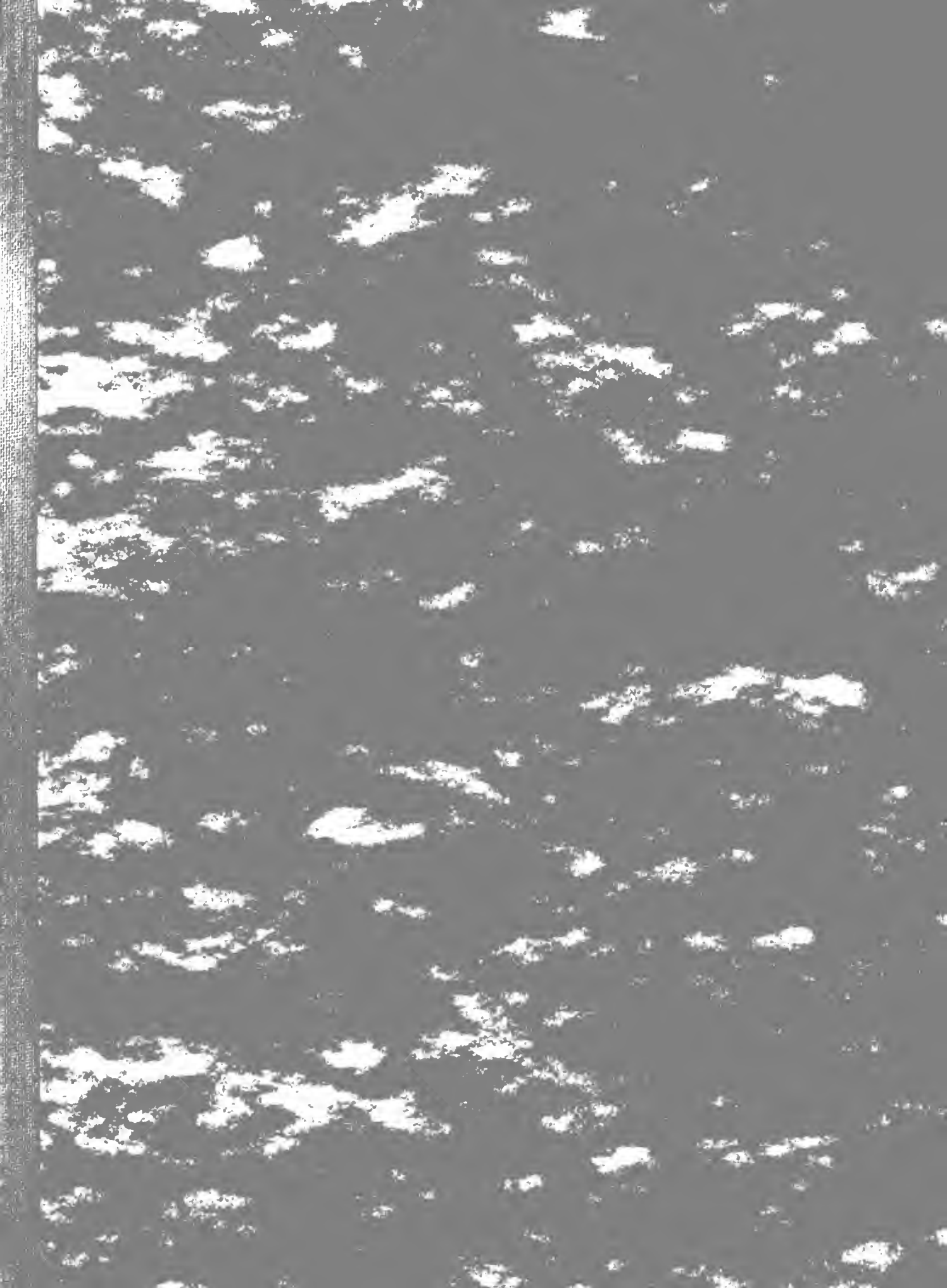


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